

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Framingham, Mass. and additional mailing offices ©1983 by CW Communications/Inc.

\$44/year

October 24, 1983

Vol. XVII, No. 43

Inside

erruns on major fed-
eral processing contracts have
come to light in a little-publicized
study. Page 2.

Equipment belonging to 15 al-
leged computer hackers in 13 cit-
ies was recently seized by the FBI.
Page 5.

If you're a business communi-
cations user, you won't have to
pay the \$6 monthly surcharge on
each long-distance telephone ac-
cess line until April 3. Action by
the Federal Communications
Commission last week also de-
layed the massive rate revisions
proposed by AT&T. Page 6.

Digital Equipment Corp. stock
plunged last week after the com-
pany announced first-quarter
earnings will be sharply below
projections. Page 8.

Computer matching is raising
privacy questions again. Page 12.

In the race to make and market
the 256K-bit dynamic RAM chip,
Western Electric is running ahead
of the U.S. team and Hitachi is out
in front of the Japanese team, a
market research firm says. Page
83.

Doubles Price/Performance

Tandem Tops Line With 32-Bit Non-Stop

By Jeffery Beeler

CW West Coast Bureau

CUPERTINO, Calif. — Tandem
Computers, Inc. last week expanded
its Non-Stop line of fault-tolerant
systems with a 32-bit mainframe that
reportedly provides twice the price/
performance of its largest sister CPU
and cuts transaction processing costs
by up to 50%.

In announcing its Non-Stop TXP
system, Tandem also cut the prices of
its existing Non-Stop II by as much
as 23% and its 2M-byte add-on mem-
ory board by 21%.

Depending on the application, a
typical TXP system can process 2.2 to
2.75 times more transactions each
second than a comparably equipped
Non-Stop II, a Tandem spokesman
said. In a maximum configuration of
16 processors, the 32-bit system re-
portedly performs 50 to 100 on-line
transaction/sec.

Moreover, the spokesman said, as
many as 14 of these 16-processor con-
figurations can be tied together
through a fiber-optic link to produce
a local complex of 224 CPUs capable
of processing hundreds and even

thousands of transactions per sec-
ond.

According to Tandem, the TXP's
expandability and computing horse-
power suit the system for emerging
applications like integrated retail

banking, videotex and factory auto-
mation. In all of these applications,
on-line transaction processing vol-
umes are already huge and are ex-
pected to grow rapidly even larger in
(Continued on Page 6)

Vendors Scrambling for Piece Of Fault-Tolerant Systems Mart

By Bill Laberis

CW Staff

Start with an on-line transaction
processing market predicted to top
\$20 billion in annual sales within
three years. Add some startling ad-
vances in commercially available,
low-cost, 32-bit microprocessors.
Then spike the mixture with some
heady entrepreneurs and healthy
slugs of venture capital.

The result is a fault-tolerant sys-
tems market that has grown from
one principal supplier — Tandem
Computers, Inc. — to over a dozen
such companies in three years.

Generally speaking, a fault-toler-

IBM Takes Wraps Off Two Micros Capable of Accessing Mainframes

By Tom Henkel

CW Staff

NEW YORK — Set on appeasing
the needs of corporate microcompu-
ter users, IBM last week announced
enhanced versions of both its Per-
sonal Computer and its Personal
Computer XT that allow users to ac-
cess information stored in IBM main-
frames.

The two micros announced by
IBM at a press conference here are:

- The Personal Computer XT/370,
which allows users to connect to a
host processor operating under the
VM/CMS operating system. The mi-
cro can also locally process VM/370
applications in up to 4M bytes of vir-
tual memory.

- In addition, IBM announced a
control program for the XT/370 that
the vendor said permits users to run
"many [370, 4300 series and 30 series]
programs unchanged on their desk-
tops using familiar program lan-
guages and command procedures."

- The IBM 3270 Personal Compu-
ter, or the 3270-PC, which lets users
tap the power of multiple host pro-
cessors while retaining local micro-
computer capabilities. The unit of-
fers users the ability to run
concurrently up to seven applica-
tions, four of which can emanate
from a larger host such as 4300 or
3080 series processors.

IBM was busy last week. In addition to introducing two micro-
computers, Big Blue took the wraps off:

- Its biggest mainframe yet, a new version of the 3084 (Page 9).
- A new top-of-the-line machine for the 8100 series (Page 9).
- Enhancements to its office systems that link previously in-
compatible machines and allow them to run under MVS and DOS/
VSE (Page 11).
- For the System/38, both communications enhancements and
support for the Personal Computer XT (Page 10).

The Personal Computer XT/370 is
basically an XT micro with three ad-
ditional circuit boards. The first
board gives the XT the ability to em-
ulate an IBM 3277 Model 2 display
station; it also allows users to connect
XT micros to an IBM 3774 controller.
The second board provides an addi-

tional 524K bytes of real memory and
the ability to store up to 4M bytes of
information virtually. The third
board includes a specialized Intel
Corp. 8087 microprocessor to per-
form floating-point operations and
two Motorola, Inc. 68000 micro
(Continued on Page 10)

DEC Shows Micro Version Of 32-Bit VAX Supermini

By Ed Scannell

CW Staff

HUDSON, Mass. — Claiming it
signals the completion of its VAX en-
gineering strategy begun six years
ago, Digital Equipment Corp. last
week unwrapped here the first mi-
cro-based implementation of its 32-
bit superminicomputer.

Using a subset of the VAX archi-
tecture, the Microvax I is said to have
35% of the processing power of the
high-end VAX-11/780 and is com-
patible with some of the programs
used by other members of the VAX
family. The desktop system repre-
sents the first step toward putting
the VAX on a chip, DEC said.

In addition to Microvax I, DEC an-
nounced:

- The VAX-11/725, a repackaged
version of its low-end VAX-11/730,
which is expected to compete against
engineering systems made by Apollo
Computer, Inc. and Sun Microsys-
tems, Inc.

- Operating system software in-
cluding Vaxelan, a VMS-compatible
development and execution system
for the VAX-11/725, 730 and 750; Mi-
cro VMS, a general-purpose subset of
VMS designed specifically for the
Microvax I; and Ultrix, a native Unix-
compatible system that initially will
be used with Microvax systems.

- A downward extension of its
System Building Block configuration
program, this one aimed at its VAX-
11/730. Its menu consists of building
blocks for the system kernel (CPU), a
system storage device, a load device,
a communications device, a console
terminal and software and services.

Microvax I is best suited for indus-
trial machine and process control ap-
plications, where it will support as
many as eight users simultaneously,
according to a DEC spokesman. It
will also be marketed as both a mul-
tiuser and a single-user system for
business and scientific environ-
ments.

Holding 512K bytes of internal
(Continued on Page 8)

Industry Spotlight

ant system is one that can withstand
a broad range of failures without cor-
ruption of data or disruption of op-
erations. Although few vendors in the
fault-tolerant market have shipped
systems to date (the ones that have
are Tandem; August Systems, Inc.;
Stratus Computer, Inc.; Synapse
Computer Corp.; and Computer Con-
soles, Inc.), several are gearing up for
announcements in 1984.

(Continued on Page 18)

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Second-class postage paid at Framingham, Mass., and

additional mailing offices. Computerworld (ISSN 0010-4841)

is published weekly, except February (5 issues), April (5

issues), May (5 issues), June (5 issues), August (7 issues), Sep-

tember (5 issues), October (5 issues), November (5 issues),

December (4 issues) and a single combined issue for the last

week in December and the first week in January by CW

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ingham, Mass. 01701.

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Special requests should be addressed to Nancy M. Shan-

non, CW Communications Inc., Box 980, 375 Cochester Rd.,

Framingham, MA 01701. ISSN 0010-4841/82 \$2.00 + \$5.00

\$1.50 a copy U.S. - \$4.00 a year. Canada, Central & So-

uth America - \$11.00 a year. Telex - \$10.00 a year. All other

countries - \$24.00 a year (airmail service). Four weeks notice

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ter Road, Framingham, Mass. 01701.

Little-Publicized Federal Study Finds Major Cost Overruns in TP Contracts

By Peter Bartolik
CW Staff

WASHINGTON, D.C. — A study of major teleprocessing contracts awarded by federal agencies has revealed major cost overruns — by 13,468% on one relatively low-cost contract — caused by factors ranging from poor management to inadequate performance standards.

The study was conducted by the U.S. General Accounting Office (GAO) in response to a request by Rep. Jack Brooks (D-Texas), chairman of the House of Representatives Committee on Government Operations. Brooks first requested review of teleprocessing in January 1982 after learning of major cost overruns in contracts awarded to Boeing Computer Services Co. by both the U.S. Navy and the U.S. Army.

The GAO review of those two contracts has led to "recompeting" of both, a Pentagon spokesman told *Computerworld* recently, adding that new contracts should be awarded soon.

The GAO reviewed 28 of the largest teleprocessing services contracts "representing a broad range of agencies, vendors and contract types," GAO Acting Director W. D. Campbell wrote in a report released last summer, but not publicized. The GAO found that for fiscal 1982, 11 of 17 competitive contracts for which data was available for analysis were awarded for a total of \$36.1 million, but will actually cost more than \$165.8 million. Eight "sole-source," or noncompetitive, contracts were not measurable, but the GAO pointed out that "sole-source contracts are

generally not as cost-effective as competitive contracts."

Of the 11 contracts with reported overruns, four were placed with Boeing, three with Computer Sciences Corp. and one each with Martin Marietta Data Systems, Inc., ADP Network, Inc., National Data Corp. and McDonnell Douglas Automation Co.

The cost overrun of 13,468% was experienced with a contract given by the Department of Defense's National Defense University to Boeing. The contract was projected to have a system life cost of \$165,721, but actually cost over \$269,000 a year and is projected to have a true system life cost of \$1.3 million.

Boeing Contract Overrun

A Boeing contract for the Army's "Request-Retain" service for recruiting support was originally estimated at \$8.49 million over a five-year system life, but actually cost \$18.8 million during fiscal 1982, according to the GAO. The Pentagon spokesman said \$53.8 million has been expended to date.

The contract between Boeing and the Navy, also for recruiting support, was estimated at an annual cost of \$523,969, but cost \$3.5 million in its first year, the GAO said. The Pentagon said \$9.6 million has been expended to date.

A contract awarded to Computer Sciences Corp. by the U.S. Department of Health and Human Services was estimated at \$1.83 million for one year, but cost an estimated \$2.5 million in 1982.

The government, according to the

report, is not even able to pinpoint exactly how much was spent in 1982 for teleprocessing services, instead estimating that between \$154 million and \$164 million was expended. Under one method of awarding contracts where agencies negotiate directly with vendors and are billed directly, rather than contracting through the U.S. General Services Administration (GSA), "the only method GSA has at present of tracking [spending] ... is through voluntary reports from the vendors," the GAO report said.

The major problems, according to the GAO, are inadequate benchmarks of projected use upon which contracts are bid and, in several cases, "unbalanced pricing," whereby low rates are bid on benchmark services, but higher service rates are bid on areas that are not properly computed into government estimates.

A staff member for the House Committee on Government Operations said it has not been decided whether the report will lead to hearings, "but it's obvious there are problems." Walter Anderson, senior associate director for the GAO, told *Computerworld* that "basically, [agency] benchmarks are not sufficient. ... I think the government agencies have got to rethink themselves."

The GAO has recommended that agencies retain monthly use data for establishing future benchmarks, seek to replace noncompetitive contracts, be required to adopt new accounting techniques and bill end users for services and change procedures to require earlier reporting of overruns.

This Week

IN DEPTH

- 'Computermarts' Follows Page 64
- Producing Reports Managers Really Use ID/11
- Artificial Intelligence in Business ID/19
- The Idle, Indispensable Micro ID/27

NEWS

- Hackers Seen Shaking Trust in U.S. Agencies 4
- FBI Seizes Gear of 15 Suspected DP Hackers 5
- FCC Delays Start of New Rates, Access Charge 6
- DEC Eyes Lower Earnings, Stock Plummet 8
- Top-of-the-Line 8100 Features 6M-Byte Memory 9
- IBM Disoss, Profs Updates Link Office Units 11
- Study: VDT Users Suffer More Than Nonusers 12
- Plan Renews Debate Over Use of Data Matching 13
- Restructure of DP, Business Strategies Urged 14
- Cullinet's IDMS/R Gets High Marks in Preview 15
- Holders of MBA Alternative Discuss the Results 21
- Turnaround Time 22
- Managers on the Move 24
- GSA Issues Study on End-User Computing 28
- International Report 30
- State DP Centers Back to Work Day After Fire 31
- Info '83 Seminar Targets DP Systems Selection 32
- Railway Makes Tracks With Systems Concept 34
- Small N.Y. Firms Seen Raising Computerization 36
- DBMS Quickens Response Time for County 37
- Data Training Conference Set for San Francisco 38
- Modeling Program Predicts Flow of Black Gold 39
- Builder Moves to New Accounts Payable System 41
- Reagan to Address OA Meet Via Videotape 45

EDITORIAL

- Editorial: The Bypass Question 46
- The Data Center: DP Staff Education Needs 47
- Human Connection: Reward DP 'Doers' 47
- Reader Commentary: Examining DP Certification 50

SOFTWARE & SERVICES

- 'Ingres/Net' Provides Access to Remote VAXs 53
- General Ledger Update Out for System/36, 38 54
- Prices of Omnilink Modules Out 55
- MSA Accounts Receivable Runs Under IDMS 56
- Package Extends HP Protocol Tool 58
- Firm Announces Financial System 59
- Henco 'Info' Gets Color Graphs 60

COMMUNICATIONS

- DEC Offers Products to Enhance Ethernet 65
- LDX-100 Converts PBX 66
- System Boasts Communications for Micros 68
- Paradyne Announces Release of 10 Products 70
- IBM Modems Out for Large Net Users 71
- Firm Unveils Data Security Unit 72
- Transmission System Bows 74

SYSTEMS & PERIPHERALS

- Small Businesses: Is Micros' Low Price Worth It? 75
- TI Micro Out With 12K Bytes of On-Chip ROM 77
- Winnie Supports DPS 6, Level 6 79
- Memory Board Out for VAX 80

OFFICE AUTOMATION

- E-Mail to Win Hearts of Offices by '87: Study 81
- OA Packages Out for UX16-20 Micro 82

COMPUTER INDUSTRY

- Race to Produce 256K-Bit Chip Heats Up 83
- Things Not Going Well This Year for IPL 83
- NCR Posts Record Earnings in Third Quarter 84
- IC Sees Swelling Market for WP Applications 85
- MCI Posts 51% Revenue Gain 86
- Big Blue Reports 25% Earnings Jump 89

ADVERTISING INDEX

- 126

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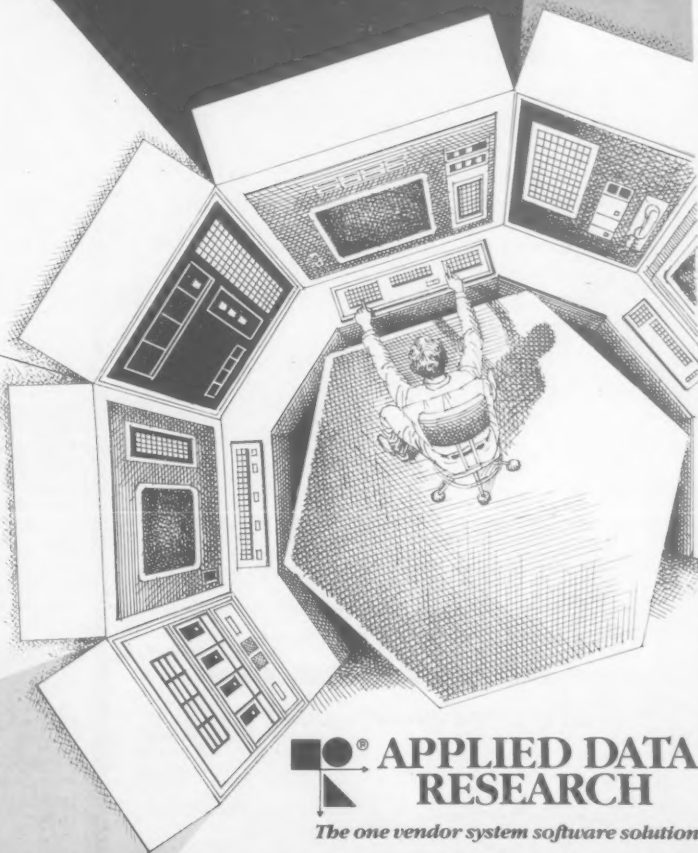
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Hackers Could Undermine Confidence In Federal Agencies, House Panel Told

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Beyond the embarrassment that federal agencies are feeling from recent claims that computer hackers have been wandering at will through government systems, there is growing fear here that these incidents portend problems far greater than those of data security.

"If computer hackers pose a danger, it is that their activities may undermine the confidence of the public in our ability to protect the data that is essential to the operation of agency programs," the Office of Management and Budget's (OMB) Deputy Director Joseph R. Wright Jr. last week told a House of Representatives subcommittee. "Individuals may fear that others will be able to examine their tax records; corporations may fear that competitors will be able to uncover important information about their operations or manufacturing processes."

This might also affect the quality of information furnished the government by citizens, Wright said, "thereby eroding the integrity of our data bases."

Rep. Dan Glickman (D-Kans.), chairman of the House Science and Technology Subcommittee on Transportation, Aviation and Materials, said the problem goes beyond security threats from outside to include

threats from within government agencies. "We want to make sure this data is secure . . . and it cannot be violated from the outside or by the government itself," he said.

Glickman's subcommittee is scheduled to resume its hearing on this subject today. Later this week, a Senate subcommittee will continue its round of hearings on computer security in the federal government.

The government at all levels is scrambling to assure the public and Congress that it views computer security with deadly seriousness. Even the supersecret, supershy National Security Agency (NSA) was willing to put in an appearance before Glickman's panel last week to discuss NSA efforts to improve the availability of secure hardware and software.

Melville H. Klein, director of the Defense Department Computer Security Institute run by the NSA, said he has been authorized to double his current staff of 100 people in the next two years. He told the subcommittee that the institute benefits both the government and the public because the results of computer security evaluations it performs on hardware and software products are available to the public.

Warren G. Reed, director of the Information Management and Technology Division at the General Accounting Office, which has been hounding federal agencies about lax

security measures for years, told the subcommittee that "serious shortfalls" continue in all aspects of government information security. "We have found policy gaps, serious management deficiencies . . . [and] inadequate internal audit capabilities," he said. "Because of these shortfalls, information system losses continue to occur due to accidental and intentional causes."

Speaking for the National Bureau of Standards, which is responsible for developing government information processing standards, Acting Director John W. Lyons said "there is a wide range of straightforward and relatively inexpensive solutions to the computer security problems faced by businesses, government, universities and individuals. Between 80% and 90% of the problems . . . could easily be avoided by using available administrative procedures and technology."

Clearer Laws On DP Access Asked by FBI

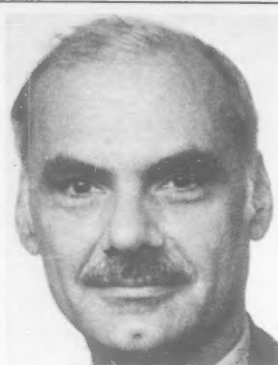
WASHINGTON, D.C. — The Federal Bureau of Investigation said last week that federal law should be clarified to penalize both those who access computer systems without authorization and those who fail to report being victimized.

Although a number of states have statutes prohibiting the type of unauthorized computer system access practiced by some computer hackers, there is no federal law to prosecute those who do so but do not damage or steal information from systems.

"Right now there is a void in the law," FBI Deputy Assistant Director Floyd I. Clarke said last Monday in testimony before the House of Representatives Science and Technology Subcommittee on Transportation, Aviation and Materials, which is looking into computer security and crime. "Our experience indicates that certain legal issues involving computer-related crime could be clarified, particularly the definition of property in the sense of a computer program having its own clearly defined inherent value, and the issue of trespass."

Despite that loophole, Clarke, head of the FBI's Criminal Investigations Division, told the subcommittee that the bureau has not had "any significant problems in prosecution of computer-related crime under already existing statutes over which we have jurisdiction, such as the fraud by wire statute."

Asked by the subcommittee if the FBI is aware of a growing problem of computer crimes against federal government agencies, Clarke said there is inadequate data on computer crime to answer the question. Kier T. Boyd, head of the FBI's Technical Services Division, said the agency has asked its field offices investigating recent complaints of hacker activity to check all seized equipment and documents for evidence of any access of government systems.



Larry Roberts

Nets' Developer Blames Systems

BURLINGAME, Calif. — Larry Roberts — the man who developed two of the networks that, according to the Federal Bureau of Investigation, were abused by 15 computer hackers — believes that the security problems lie not in the networks themselves, but rather in the computer systems.

Roberts, now president of the worldwide courier service DHL Corp. here, became known as the father of packet switching when from 1967 to 1973 he helped develop the U.S. Department of Defense's (DOD) Arpanet, the first packet-switched network. In the 1970s, Roberts founded and headed Telenet Communications Corp., a public packet-switched network company that was later sold to GTE Corp.

Since the most recent occurrence of computer hacking is thought to have taken place over the Telenet network and at least one hacker is thought to have accessed DOD computers through Arpanet, Roberts is uniquely qualified to comment on what problems are leading to so much illegal computer tampering.

"It's unfortunate that the attention focuses on the networks when that's not the issue," Roberts told *Computerworld* last week. "If the network did too much to prevent people from getting on, there wouldn't be the thousands of users there are now."

"Anybody can have access to a network if he pays his bills, so [system] users have to provide their own security. It would be presumptuous of the network to provide security."

Roberts said he anticipated security problems such as the ones arising today when he was developing Arpanet. He conducted experiments and found that unauthorized users could misuse the network. Roberts warned computer users to take precautions, and "some of the 50 to 100 computer organizations took our advice; others didn't."

There are two ways to discourage computer hacking, according to Roberts. "The best treatment is to crack down on hackers occasionally, as [the FBI is] doing, and to have the computer people realize it is their security problem."

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FBI Seizes Gear of 15 Suspected DP Hackers

By Jim Bartimo
CW Staff

Federal Bureau of Investigation agents armed with search warrants recently confiscated equipment belonging to 15 alleged computer hackers in 13 cities. The hackers are suspected of tapping into computers at organizations that include the U.S. Department of Defense (DOD) and the National Aeronautics and Space Administration (Nasa).

The FBI said it confiscated the computers and communications equipment of the 15 — none of whom was charged with a crime — after they allegedly used GTE Telenet Corp.'s public packet-switched network to access the systems illegally. Based in Vienna, Va., the network provides such services as the Telemail electronic mail service to an estimated 200,000 terminal users and 2,000 computer systems in more than 300 U.S. cities and 50 foreign countries.

The 15 alleged intruders on Telemail were detected during routine monitoring by Telenet, according to a statement released by the firm. The FBI was notified immediately, and password procedures were changed to make access more difficult, according to GTE Telenet spokeswoman Claudia Houston.

The FBI is only in the investigative stages of its case and will not be ready to prosecute under wire fraud laws for several months. "There were 15 people raided; I don't know that 15 people actually broke in," said FBI spokesman James Mull of the bureau's Alexandria, Va., office.

House Set to Get DP Crime Bill

WASHINGTON, D.C. — An extremely tough federal computer crime bill that calls for mandatory fines and prison terms was set for introduction in the U.S. House of Representatives last week.

The bill, short and to the point, would mandate fines up to \$100,000 and/or jail terms up to 10 years for anyone using a computer without the consent of its owner. It would bring federal prosecution down on whomever "willfully uses a computer capable of being programmed or reprogrammed in the course of normal operations in a manner not authorized by the owner of that computer . . . if such use affects interstate or foreign commerce."

Charlotte Casey, an aide to Rep. Lawrence Coughlin (R-Pa.), sponsor of the bill, said that Coughlin hoped to have the bill introduced by the end of last week. The congressman has also agreed to cosponsor the Federal Computer Systems Protection Act, introduced earlier by Rep. Bill Nelson (D-Fla.). The difference between the two bills is that the Coughlin bill, besides being much shorter and devoid of the lengthy definitions of the Nelson bill, provides penalties twice as stiff and would make it impossible for a judge to suspend the sentence, offer probation or make the jail term run concurrently with other terms a violator may face.

"They're not all kids like a lot of the newspapers have reported. Some of them are adults."

Nasa, a Telemail subscriber, last week confirmed reports that unauthorized entry into the space agency's systems was possible. System security has since been beefed up, but a Nasa spokesman said no damage or file deletions had yet been found.

"I heard that one of the kids destroyed tons of files," said Bill O'Donnell, Nasa public affairs officer, "but we haven't found anything wrong. The most he could have destroyed is one day's work."

One of the hackers whose home was raided is 18-year-old Dennis Warner Jr. of Tucson, Ariz., who admits to being a computer enthusiast

but denies accessing any proprietary government information. Warner told *Computerworld* last week that he has had contact with a computer hacker who claimed to have accessed the DOD's Arpanet network.

Warner, who repairs aircraft components as his livelihood, claimed that he was given a free trial password to Telemail by a fellow user of Compuserve, Inc.'s bulletin board user message exchange. Warner said he believed that the user was a Telemail representative.

Warner accessed Telemail approximately six times in late July using his Radio Shack TRS-80 Model 1 microcomputer. He said it was not until after he was raided by the FBI that he learned the password given to him

on Compuserve was not a legitimate trial offer.

Warner said he has communicated with many of the people who claim to have accessed computer systems and were raided by the FBI. One such hacker calls himself "The Wizard of Arpanet" because he claimed that he accessed the DOD's Arpanet network. The DOD recently divided Arpanet into two networks to avoid such hacking [CW, Oct. 10].

The Wizard was identified in the *Detroit Free Press* as 14-year-old Eric Stajda of Detroit. "That kid in Detroit deserved to get caught," Warner said. "He was crazy. He would say on an open-line [bulletin board] conversation on Compuserve that he had broken into a DOD computer."

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SAMPLE OF FATS REPORT

FAST ANALYSIS OF TAPE SURFACES DETAIL REPORT -- FATS VER 4.0 Z				LOCATION	LENGTH	RETRIES	ACTION
MESSAGE	ID	UCB LABEL	OPTION PASS FILE NO RECORDS				
FATS204	TAPE2	281 987654		1407 FT	4 IN	10	PERM DATA CHECK
FATS204	TAPE2	281 987654		1407 FT	8 IN	10	PERM DATA CHECK
FATS204	TAPE2	281 987654		1408 FT	13 IN	10	PERM DATA CHECK
FATS204	TAPE2	281 987654		1408 FT	17 IN	10	PERM DATA CHECK
FATS204	TAPE2	281 987654		1408 FT	21 IN	10	PERM DATA CHECK
FATS204	TAPE2	281 987654		1409 FT	25 IN	10	PERM DATA CHECK
FATS204	TAPE2	281 987654		1409 FT	29 IN	10	PERM DATA CHECK
FATS204	TAPE2	281 987654		1409 FT	33 IN	10	PERM DATA CHECK
FATS204	TAPE2	281 987654		1409 FT	37 IN	10	PERM DATA CHECK
FATS204	TAPE2	281 987654		1410 FT	39 IN	10	PERM DATA CHECK
FATS204	TAPE2	281 987654		1410 FT	43 IN	10	PERM DATA CHECK

The length of these bad spots would cause unrecoverable data checks and I/O errors during processing.

FAST ANALYSIS OF TAPE SURFACES DETAIL REPORT -- FATS VER 4.0 Z				LOCATION	LENGTH	RETRIES	ACTION
MESSAGE	ID	UCB LABEL	OPTION PASS FILE NO RECORDS				
FATS107	TAPE1	280 123456		1 FT		01	LABEL WRITTEN
FATS204	TAPE1	280 123456		1 FT		01	TEMP DATA CHECK
FATS204	TAPE1	280 123456		2 FT		02	TEMP DATA CHECK
FATS204	TAPE1	280 123456		2375 FT	4 IN	10	PERM DATA CHECK
FATS204	TAPE1	280 123456		2375 FT	8 IN	10	PERM DATA CHECK
FATS204	TAPE1	280 123456		2375 FT	13 IN	10	PERM DATA CHECK
FATS204	TAPE1	280 123456		2375 FT			TAPE INDICATE

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FCC Delays Start of New Rates, Access Charge

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Saying that there are "many substantial and controversial issues" yet to be resolved, the Federal Communications Commission (FCC) last week delayed until April 3 a massive revision of local and long-distance communications rates that AT&T and the Bell operating companies wanted to go into effect Jan. 1.

The commission also deferred its access charge plan, which drastically

AT&T Expecting Lower Earnings

NEW YORK — AT&T announced here last week that it is decreasing the value of its telephone equipment and network facilities assets and making other accounting changes that will reduce the company's 1983 earnings by \$5.2 billion, or \$5.50 per share.

The changes were necessitated by the impending breakup of the Bell system and AT&T's entry into competitive markets, Board Chairman Charles Brown said at a press briefing here.

The changes will not have any impact on the assets, income or equity of any of the divested Bell operating companies. "It merely clears up AT&T's balance sheet as we prepare to enter a new era," Brown said.

alters the way local telephone companies are reimbursed for providing access to the long-distance network.

For business communications users, the two actions deferred a monthly surcharge of up to \$6 on each access line connecting their premises with the local telephone network and a monthly surcharge of \$25 per termination on private lines leased from local telephone companies. The actions also delayed AT&T's proposed rate changes — both increases and decreases — for Message Toll Service, Wide Area Telecommunications Services (WATS) and interstate private line service.

The deferral of the access charge plan raised the question of what would happen to existing tariffs after Jan. 1. Jerald N. Fritz, acting chief of the FCC's Tariff Division, agreed that the "division of revenues" process underlying those tariffs will have to be altered, but said AT&T could make the changes by changing the computer programs that determine how much AT&T Communications, formerly its Long Lines Division, pays local telephone companies for access service.

The question about existing tariffs was asked at a press briefing held in New York last Wednesday by AT&T on a different matter. "It's not possible to continue the division of revenues process as is," answered AT&T Board Chairman Charles Brown, adding that "conceivably" this process can be modified. But Brown said

AT&T Rivals Free to Raise Rates

WASHINGTON D.C. — Long-distance telephone carriers in competition with AT&T will no longer have to request permission from the Federal Communications Commission (FCC) to raise their rates, the FCC decided last week.

Companies such as MCI Communications Corp. and GTE Corp. will not have to justify their increases to the FCC. In contrast, AT&T must continue to notify the

FCC of price changes for its basic service 90 days prior to their taking effect.

Long-distance carriers other than AT&T will still be regulated to the point that they must charge nondiscriminatory rates, and the FCC will still investigate any unfair pricing allegations.

The commission also asked for public comment on how AT&T should be regulated in the future.

it is too soon to estimate what it would cost or how long it would take.

Brown said he was "astonished" by the FCC's action, which "throws our existing plans awry."

Reason for Delays

In a press release issued last Tuesday, the FCC said it acted because of questions raised in the more than 200,000 pages of tariffs filed by AT&T and the Bell operating companies Oct. 3. There are "many substantial and controversial issues which must be resolved," and the originally proposed Jan. 1 effective date did not allow enough time to review them.

If the review process is completed before April 3, the FCC will "consider" an early termination of its orders suspending the revised tariffs and access charges. However, FCC rules allow a five month delay — meaning until the beginning of June.

Observers suspect that the FCC actions were motivated at least partly by politics. Intense opposition has developed in Congress to the access

charge plan, primarily because it will raise telephone rates for many residential users. The observers say it is possible that the FCC will order the phone company to make deeper long-distance rate cuts after it finishes reviewing the Oct. 3 filing.

Rates for business users are also likely to be affected by the FCC review. "AT&T has proposed substantial increases in its private-line rates and a complete restructuring of its private-line tariffs," the FCC release explained. "These changes must be closely scrutinized to determine whether they are lawful."

The observers pointed out that possibly the most interesting possibility raised by last week's FCC action is that the commission, after going through those 200,000 pages of tariff filings and struggling with all of the unresolved questions, will be forced to repeat the whole exercise. Two bills pending in Congress would bar for at least two years the imposition of surcharges on residential telephone customers.

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Non-Stop TXP Unveiled

(Continued from Page 1)

the near future.

Like the 16-bit Non-Stop II, the TXP ensures uninterrupted access to system resources and supports Tandem's Guardian control program as well as the company's Encompass data base management facility. The just-introduced system also operates with the same peripherals, runs the same application packages and fits in the same cabinet as the Non-Stop II, the spokesman noted. The TXP's resulting compatibility with existing hardware and software enables the 32-bit system and the Non-Stop II to be intermixed in the same installation, he pointed out.

Tandem credited the TXP's performance edge over the Non-Stop II partly to the 32-bit system's internal design features, some of which include dual data paths and dual 16-bit arithmetic logic units (ALU). The Non-Stop II, by contrast, incorporates only one data path and one ALU.

Using the TXP's 64-bit memory accessing capability, each of the system's data paths and ALUs reportedly manipulates 32 bits at a time.

A second reason for the TXP's superior processing power is the system's improved machine cycle time — 83 nsec compared with 100 nsec for the Non-Stop II, the spokesman said. Other factors contributing to the TXP's improved performance

over existing Tandem offerings include the system's 32-bit native-mode addressing feature and its unusually large supply of high-speed cache memory.

Each TXP processor comes equipped with 64K bytes of cache, to which the system can reportedly gain access in 83 nsec. In recent tests of the TXP, the information necessary to execute a given instruction was found to reside in cache memory about 98% of the time, the spokesman said.

The result is that the system's read/write memory cycle of 400 nsec, which is identical to that of the Non-Stop II, is effectively reduced to 116 nsec, the spokesman explained.

The TXP's 32-bit native-mode addressing capability gives the system a 1G-byte virtual memory capacity per processor, according to Tandem.

A basic TXP configuration, including dual 2M-byte processors, four 128M-byte disk subsystems, power supplies, the Guardian operating system and the Encompass data base management facility, costs \$328,550.

In the wake of Tandem's latest price cuts, a similarly configured Non-Stop II system and a 2M-byte memory expansion board now cost \$195,000 and \$22,000, respectively.

First customer shipments of the TXP will begin next month from Tandem at 19333 Vallico Pkwy., Cupertino, Calif. 95014.

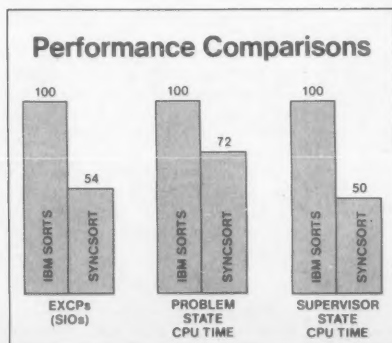
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DEC Eyes Lower Earnings; Stock Plummets

By Peter Bartolik
CW Staff

Digital Equipment Corp. last week shook Wall Street and raised questions about the company's stability after it announced that first-quarter earnings will be sharply below projections. The news caused DEC's stock to plummet more than 21 points in one day alone on the New York Stock Exchange.

Several other major vendors, despite impressive earnings reports, also saw the value of their stock drop as investors apparently lost faith in the computer industry. IBM stock dropped \$3 on Tuesday, but recovered by \$1.75 on Wednesday during a broad market decline.

DEC announced Tuesday that its quarterly earnings report, due out tomorrow, is expected to show earnings of 25 cents to 35 cents per share, far below the "flat" earnings that investment analysts have been predicting since late August. Earnings for the same period last year were \$56.8 million, or \$1.02 per share, on revenues of \$927 million, and this week's report is expected to show a 65% to 76% drop, DEC said.

The financial update was announced at about 2 p.m. Tuesday, just hours after the company announced the Microvax I, and caused a turn-over of almost three million DEC

shares on the exchange. The price of DEC stock dropped \$21 to close at \$79.28, a far cry from the high of \$132 reached this past March.

The decline continued Wednesday with the price dropping another \$6.75.

DEC said the lower earnings and revenues resulted from smaller than expected shipments of personal computers and from the inability to manufacture and ship new products, which include the Micro-PDP/11 and two new disk storage devices for minicomputers and superminicomputers.

Mark A. Steinkrauss, manager of investor relations for the second largest computer vendor, told *Computerworld* that DEC "didn't [publicly] quantify the shortfall in [terms of] units or dollars." He said the decision to announce the lowered expectations was made after the numbers became "firm enough" to indicate the problem.

"As painful an experience as it was," he said, the company felt it should be "professional" and make an announcement "rather than have data leak out."

Wall Street financial analysts had cooled on DEC's prospects for the first quarter after the release of the fiscal 1983 report showing the first decline in profits in 13 years [CW,

Aug. 15]. Stephen K. Smith, an analyst with Paine Webber Mitchell Hutchins, had revised his projection for first-quarter earnings from \$1.48 per share in early August to \$1.11 per share in late August.

Smith continued to favor DEC stock as other analysts stopped recommending it, but now, he said, DEC faces "a tough couple of quarters," and he has lowered his fiscal year 1984 earnings estimate of \$7.40 per share to \$3 or \$4 per share and dropped 1985 projections of \$10.50 per share to \$8 per share.

Smith said the disk problem, which he earlier had thought was resolved, probably hurt revenues "as a lot of packages couldn't go out the door." He said DEC still has a lot of strength and many products that will be successful, such as the Microvax, but DEC built expense levels too high this year.

Two industry analysts contacted by CW differed sharply in their analyses of the situation.

Peter Lowber, DEC watcher at The Yankee Group, downplayed the impact of DEC's showing in the personal computer market and pointed the finger at "missed opportunities and laggard management." He suggested that recent personnel losses may have played a role and said DEC "needs to reorganize marketing and maybe bring new people in."

Jack Hart of International Data Corp., on the other hand, said, "Clearly, the personal computer line results have been disappointing and under plan; they really have not shipped as many as they had hoped. . . I wonder about whether the [personal computer] product line is going to be the success they think it is."

Moreover, he added, "One major factor that I think has been overlooked is that in the last four to six months, they have gone through some very major reorganizations."

Lowber believes the company is lacking in many areas that will affect

it over the long term. He said DEC should develop third-party software agreements and reevaluate the markets at which DEC aims its products.

Lowber also said DEC should never have allowed competitors to catch up with the high-end VAX-11/780. "It's been two years since DEC upgraded their high end, and it will be three years next year," he noted.

DEC Introduces Microvax I

(Continued from Page 1)

memory, the \$9,995 version of the desktop unit was designed for run-time and memory-only applications and does not include disks. With DEC's 5¼-in., 10M-byte RD51 Winchester disk subsystem and RX50 dual floppy diskette drive, which handles up to 800K bytes, the system costs \$13,880.

The Microvax I CPU is packaged in two boards (not including the memory board) that reside in adjacent slots in the system's backplane. One module features the 32-bit data path, microsequencer and control store, while the second board contains memory management and a cache module that supplies the logic for interfacing the Q-bus to the internal VAX architecture.

Microvax is expected to be delivered by March.

A VAX for Open Offices

The VAX-11/725, which DEC is billing as its lowest cost Unibus-compatible system, uses the same processor as the VAX-11/730, but sports the company's 52M-byte RC25 disk subsystem, also introduced last week. About the size of a two-drawer filing cabinet, the 725 is half the height of the 730 and should fit under most office desks or tables, DEC said. It was designed specifically for open-office locations.

DEC said it plans to use the low-end system to support technical workstations and as a multiuser system for general-purpose applications in industry, government and education.

As a multiuser system, the 725 supports as many as eight users at once for applications involving software development, order entry, inventory control and scientific word processing.

DEC is offering three versions of the VAX-11/725, which range in price from \$24,950 to \$36,800. The system is scheduled for delivery next month.

Software Additions

The Vaxelan software serves as a subsystem to DEC's VMS operating system for developing applications in real-time control and distributed environments. Vaxelan applications are written in a native-mode version of Pascal.

Completed applications can be downloaded across network links or transferred to target systems by disk or tape, the DEC spokesman noted.

Licenses for the development system start at \$8,200. A runtime license is \$100, DEC said from 146 Main St., Maynard, Mass. 01754.

Knowles to Steer Lexidata

BILLERICA, Mass. — Lexidata Corp. last week announced that it had picked former Digital Equipment Corp. executive Andrew C. Knowles to become president and chief executive officer of the graphics terminal and engineering workstation manufacturer based here.

Knowles was instrumental in marketing DEC's PDP-11 minicomputers and, more recently, its personal computer line before becoming the sixth DEC vice-president to jump ship in

the last two years.

He will replace Ralph T. Linsalata, who will remain a member of Lexidata's board of directors and serve as a special consultant to the company. Linsalata issued a statement saying the hiring of Knowles and of Ross Belson as senior vice-president of operations will "provide the strong management foundation necessary to build a significant company in the graphics terminal and engineering workstation business."

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New Top-of-the-Line 8100 Features 6M-Byte Memory

By Tom Henkel
CW Staff

NEW YORK — IBM last week capped its 8100 series of distributed processors with a new top-of-the-line machine that offers 2.4 times the performance of the 8140 Model C processor and up to 6M bytes of main memory, three times the capacity of the 8140C.

At a press conference here, the company also announced updates of the 8100's two operating systems, DPPX/SP and DPCX.

The newly introduced 8150 employs the same dyadic architecture — two closely coupled processors — that IBM uses on its larger 3081 processors. The two processors can share processing and I/O work loads, increasing system availability and reliability, IBM said.

The 8150 features very large-scale integration design in its circuitry. The machine employs bipolar logic chips — a first in the industry, according to IBM — which allow a packing density of 3,000 to 5,000 circuits per chip.

In addition to the 6M bytes of main memory, IBM reportedly added to the 8150 a storage management technique that incorporates a logical storage area of 16M bytes.

Operating System Updates

Release 2 of the DPPX/SP operating system, developed specifically for the 8150, features a shadow file capability that duplicates a primary disk file on a backup file and improved user access to data through an indexed file management capability, according to IBM.

Moreover, with Release 2, users of IBM Displaywriter word processors and Scanmaster 1 high-speed facsimile machines can access information in a host through an 8100 pass-through function.

Release 2 also features an enhanced communications network management function that provides an 8100-generated alert to the host when a problem develops with an attached terminal, line or modem. Finally, included in Release 2 is the ability to process up to 16 batch jobs concurrently, IBM said.

Highlights of DPCX Release 4 include ease-of-use features that permit users to assign commands, procedures or programs to special-function keys so they can be invoked by a single keystroke. An enhanced data stream compatibility facility enables a user to alternate between host applications and local applications without having to sign off one system and log onto another.

Release 4 also alerts the host processor of problems in the distributed network.

Besides updating the two operating systems, IBM enhanced its Distributed Office Support Facility (DOSF) for the 8100. With Release 4 of DOSF, the office system capability of DPCX, users of office workstations can automatically capture and store data in the 8100 processor. As a result, office workers creating documents with DOSF can incorporate information from the host processor into their documents.

The 8150 is available in three models: the B20, B40 and B60 with 2M, 4M and 6M bytes of main memory, respectively. The purchase prices for the units range from \$115,000 to \$145,000; first shipments are scheduled to begin in June.

Both operating system upgrades are available for a monthly fee or a one-time charge. The monthly charge for DPPX/SP Release 2 is \$760, and the one-time charge is \$19,600. It will be available in June.

DPCX Release 4 costs \$414/mo or \$6,900. DOSF Release 4 costs \$704/mo or \$12,300. Both DPCX Release 4 and DOSF Release 4 will be available in February.

IBM Configures 96M-Byte 3084, Its Biggest Mainframe Yet

NEW YORK — IBM last week extended its top-of-the-line 3084 by configuring a system with a maximum main memory capacity of 96M bytes instead of 64M bytes.

IBM said the new system, the 3084 Model Q96, offers a growth path for users of the recently announced 3081 Model K48 processor. The 3084 is basically two closely coupled sets of dyadic 3081 processors; two 48M-byte 3081 K48 processors essentially make up a 3084 Model Q96.

The price of upgrading a K48 to a Q96 is \$3,465,000.

For current users of the 64M-byte 3084, the Model Q64, IBM

said it will take about eight hours to upgrade in the field to a Q96. This upgrade costs \$640,000.

The cost for upgrading the 48M-byte 3084 processor, the Model Q48, to the Q96 is \$960,000. The upgrade from a Model Q32 to a Q96 costs \$1,280,000.

Like the 32M-, 48M- and 64M-byte versions of the 3084, the 3084 Model Q96 runs under IBM's MVS/SP Version 2 operating system.

First customer shipments of the K48-to-Q96 upgrades will begin in the second quarter of 1984; the Q64-to-Q96 upgrade will begin shipping in the third quarter.



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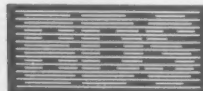
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Latest IBM Micros Target Corporate Users

(Continued from Page 1)

processors both to reproduce and to emulate segments of the 370 instruction set.

The XT/370 reportedly offers roughly half the internal performance of the 4321, the smallest IBM 4300 series processor, an IBM spokesman noted.

Three Workstations in One

The control program for the XT/370, known as Virtual Machine/Personal Computer (VM/PC), gives the micro CMS functions along with VM/SP capabilities. This, IBM contends, makes the XT/370 three workstations in one — it can function as a standard Personal Computer XT, as a 370 VM/CMS workstation or as an

IBM 3277 display terminal connected to a host processor.

The XT/370 will be available in the second quarter of 1984. The purchase price of the micro with 10M bytes of fixed disk storage is \$8,995. With 20M bytes of storage, the unit costs \$11,690.

Current users of the IBM Personal Computer XT can upgrade their processors to XT/370 configurations for \$3,790, IBM said.

Seven Windows

The 3270 Personal Computer reportedly displays information simultaneously in up to seven user-defined windows. The windows can contain information both from host processors and from the local Person-

al Computer.

Up to four windows can be devoted to displaying information from host processors such as an IBM 4300 series or 30 series machine.

While some knowledge of IBM 370-era operating environments is necessary to use either the XT/370 or the 3270-PC in conjunction with a host processor, the 3270-PC includes a control program with a self-teaching diskette called Helper for less experienced users.

The 3270-PC is available with a newly announced high-resolution, eight-color display unit, the 5272, which enables the user to highlight specific windows or data within windows, according to IBM.

Like the XT/370, the 3270-PC uses

IBM's PC DOS 2.0 operating system when it is used as a microcomputer.

Three Models

The 3270-PC is available in three standard models with main memory ranging from 256K to 640K bytes.

The Model 2 offers 256K bytes of main memory, one dual-sided diskette drive and printer adapter for \$4,290. The mid-range Model 4 offers all the Model 2 features plus a second dual-sided diskette drive and a 64K-byte memory expansion option that provides a total of 320K bytes of main memory; it is priced at \$5,319.

The top-of-the-line 3270-PC, the Model 6, contains the basic features of the Model 2 plus a 10M-byte fixed disk drive and a 64K-byte memory enhancement, offering a total main memory capacity of 320K bytes. It costs \$7,180.

The 5272 color display costs \$995, and the 3270-PC control program, which includes the Helper facility, is available for a one-time fee of \$300.

A 3270-PC file transfer program product, which transfers bulk data to and from a host processor running VM/SP or MVS/TSO, costs \$600.

Deliveries of the 3270-PC and related products will begin in the first quarter of 1984, IBM said.

IBM Offers Enhancements For System/38

NEW YORK — IBM last week extended communications and office support for its System/38 small business system. Some of the announcements also affect the smaller System/36 and System/34 processors.

The announcements include:

- Display Station Passthrough software that allows a System/38 user to use Systems Network Architecture (SNA) to access two or more System/38 processors at remote locations. Available next September, the no-charge feature also includes automatic routing to handle user logon and security clearances for intermediary systems in an SNA network.
- Software that allows a System/38 operating in an SNA/Synchronous Data Link Control (SDLC) environment to emulate the 3270 CRT terminal. This will also be available next September on a no-charge basis.
- The capability to attach a Personal Computer XT to a System/38, System/36 and System/34 through a 5250 display terminal emulation program. The support program and some hardware adapters cost \$893. IBM also announced a Host Support Utility that allows the System/38, System/34 and System/36 to support the PC DOS Release 2.0 operating system used on the Personal Computer XT. Both products will be available this December.
- Enhancements to the Office/38 line of program products that offer directory list management and direct link support to text management. There is no charge for either enhancement, both of which are available now.

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IBM Disoss, Profs Updates Link Different Office Units

By Tom Henkel

CW Staff

NEW YORK — IBM came one step closer to linking previously incompatible office machines last week when it announced enhancements to its Distributed Office Support System (Disoss) and Professional Office System (Profs).

In addition, IBM enhanced its Systems Network Architecture to allow office machines to communicate with a host processor.

At a press conference held here at its new Gallery of Science and Art, IBM said it has nearly realized its 1980 statement of intent to link office systems. With the latest announcement, IBM provided support for the exchange of letters, memos and other documents among IBM 8100 and 5520 distributed processing systems and the Displaywriter word processor by:

- Giving Disoss the ability to run under the MVS and DOS/VSE operating systems through IBM's SNA. This is made possible by an enhancement to SNA called Systems Network Architecture Distributed Services (Snads) which, according to IBM, "provides the framework for document distribution among various systems."

- Providing Release 2 of Profs, IBM's VM host-based office software, and Release 2 of the Host-Displaywriter Document Interchange (HDDI). The two releases provide extended Displaywriter support for text and data processing applications.

- Announcing an updated release of the Distributed Office Support Facility (DOSF) that allows 8100 users to exchange documents with the Dis-

playwriter and 5520.

- Offering a new release of the 5520 Administrative Processing Program 5611-SS2. Release 3 implements the Snads distribution connection between the 5520 and Disoss.

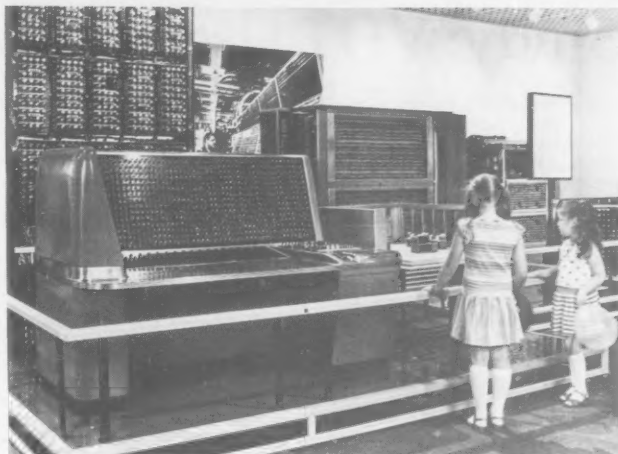
- Announcing a Disoss/Professional Support Program that extends Disoss functions to users of the IBM 3270 line of CRT terminals.

Disoss Version 3 Release 2 allows 8100, 5520 and Displaywriter users to take advantage of the newly announced Snads capabilities. The initial license fee for Version 3 Release 2 costs \$4,000 for sites running under MVS and \$1,500 for DOS/VSE. The monthly charge for the new release is \$1,300 for MVS and \$500 for VSE. For customers qualifying for the IBM's Distributed System Licensing Option (DSLO), the initial license charge is \$3,000 (MVS) and \$1,125 (VSE). The monthly DSLO charge is \$975 for MVS and \$375 for VSE.

Release 2 of Profs offers users enhanced proofreading services, additional control file aids, more administrative aids, improved distribution services, note functions, document printing functions and additional data base management functions. Its initial license fee is \$4,000 and \$600/mo. Under DSLO, Profs Release 2 costs \$3,000 for the initial fee and \$450/mo.

Release 2 of HDDI allows Profs users to exchange documents and offers Displaywriter users help screens and menus for Profs. HDDI Release 2 is scheduled for delivery in April and costs \$1,000 for the initial fee and \$250/mo.

The 5520 Administrative Processing Program 5611-SS2 supports both



Looking like something out of a science fiction movie, an IBM Selective Sequence Electronic Calculator, the first computer to combine electronic computation with stored instructions, dwarfs two pig-tailed visitors to IBM's Gallery of Science and Art at 590 Madison Ave. in New York, where IBM last week held the press conference announcing two new microcomputers (Page 1) and several other products. The machine, which was the state of the art in 1947, has more than 12,000 vacuum tubes and 21,000 electromechanical relays. It is one of more than 300 devices on display at the museum in an exhibit entitled "Innovation in IBM Computer Technology." The exhibit, which spans five decades of computer innovation, is free and open to the public through Nov. 19.

final form and revisable form document interchange between the 5520, Displaywriter and 8100. In addition, it allows attachment of the newly announced Personal Computer XT/370 to 5520 systems and supports emulation of 3270 terminals on the 5520.

There is a one-time license charge of \$10,500 or a monthly charge of \$389 for Program 5611-SS2, available next October.

DOSF Release 4 gives 8100 users enhanced automated text processing capabilities plus additional data processing functions. It will be available in February for \$12,300 and \$704/

mo. Under DSLO, the new release costs \$10,455 and \$598/mo.

The Disoss/Professional Support package provides Disoss document distribution, library and applications services support to users of 3270 terminals and the newly announced 3270-PC. With the package, 3270 users can create, edit, print and distribute final form documents in the same format as users of 8100, 5520 or Displaywriter systems.

The package is available for an initial license fee of \$5,700 for MVS users and \$3,100 for VSE users. It will be available next month.

IBM Introductions Seen Escalating Market Struggle

By Tom Henkel

CW Staff

IBM last week dropped a bomb on the microcomputer market, further clouded its role in distributed processing and unveiled what may prove a key piece in its rumored local-area network strategy.

The introduction of two microcomputers that can run mainframe application software appears to have complicated the issue of IBM mainframe compatibility for competing vendors in the microcomputer market. Prior to IBM's introduction of the Personal Computer XT/370 and the 3270 Personal Computer, other microcomputer vendors could claim compatibility with IBM mainframes by altering their micros to operate as dumb IBM 3270 terminals.

Now IBM has added another dimension to mainframe compatibility — the ability to access host processor applications in the VM/CMS operating environment and concurrently use those applications with programs running under PC-DOS, the primary operating system for IBM's Personal Computers, noted Frank Gens, an analyst with The Yankee Group research firm in Boston.

But while access to mainframe processors may prove a boon to fairly sophisticated users, such as systems

developers, it currently means little to the executive operating a Personal Computer, said Dr. John Bennett, corporate director of data processing at United Technologies Corp. in Hartford, Conn. "I don't see an executive using VM," Bennett said.

And even if an executive was willing to learn how to work with VM, the DP department may not want to let him access mainframe-based applications. Moreover, Bennett said, it is hard to justify the approximately \$10,000 cost of a micro with the ability to access a host processor when dumb 3270 terminals cost less than \$4,000.

But Gens said mainframe compatibility is only the beginning of a new era of microcomputer capabilities. The announcement of the Personal Computer XT/370 and 3270 Personal Computer will spark the establishment of a swarm of software development houses offering VM-compatible programs that can be used to integrate microcomputer and mainframe data. Those programs, he theorized, will be much easier to use than VM and will give the user fairly easy access to mainframe data.

Gens contended that IBM is forcing developers of microcomputer software into its home court. He explained that while PC-DOS is based

on an almost industry-standard operating system (Microsoft, Inc.'s MS-DOS), VM is strictly under IBM control.

Impact of the 8150

In addition to sending shock waves through the microcomputer community, IBM's announcements last week demonstrated new support for its 8100 line of processors. After introducing the new-technology 8150 — a dyadic processor complex employing very large-scale integration technology and bipolar chips — IBM called the 8100 line its "primary host-managed distributed data and office processing system."

The 8150 appears to be IBM's closest attempt at offering a nonstop processor, noted long-time 8100 supporter William Ackerman, president of DPX, Inc., a Cupertino, Calif., consulting firm.

But to many industry watchers, the 8150 is a phoenix rising from the ashes. The 8100 series has been upstaged since several months after its 1979 introduction, when IBM announced the popular 4300 series of processors. In addition, while the 8100 has always been billed by IBM as a distributed processing system, the 4300 series and, to some degree, the System/38 offer the same capa-

bilities.

Jack Hart, an IBM watcher with International Data Corp. in Framingham, Mass., observed that IBM has spent millions developing the 8100 and its two operating systems, DPPX and DPCX. He suggested that IBM has made too big an investment in the 8100 product line to kill it off.

But Ackerman disagreed. In an interview last week, he said the announcement of the 8150 as well as new versions of DPPX and DPCX support his contention that the 8100 line plays a pivotal role in IBM's 1980 statement of intent to integrate office functions with data processing.

IBM may have offered a glimpse of the future with the enhancements it made last week to the Distributed Office Support System (Disoss) and the Professional Office System (Profs). The enhancements allow the 8100 and 5520 distributed processing systems and Displaywriter word processors to communicate with each other.

The enhancements also offer a link to mainframe processors through Systems Network Architecture Distribution Services (Snads). Gens said Profs, Disoss and Snads could work together to form the basis of IBM's rumored local-area network.

Study: VDT Users Suffer More Than Nonusers

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — A survey of video display terminal users has confirmed reports that users suffer more vision problems, headaches, muscle strain, backaches, stress and other ills than nonusers.

The 2½-year study could not, however, verify claims from some VDT users that they may suffer reproductive problems or develop cataracts as a result of terminal use. Dr. Arthur L. Frank, the study's director, told a U.S. House of Representatives Education and Labor Subcommittee last Tuesday.

The study's findings are not inconsistent with earlier VDT use studies, which have confirmed increased health problems among users, but have found no proof that permanent physical damage is caused by the machines themselves. A recent National Academy of Sciences report, for example, concluded that ergonomic deficiencies in VDT job design may be causing health complaints, but that VDT use does not cause eye disease or damage [CW, July 18].

Reporting on the most recent study, which was financed by the Newspaper Guild and surveyed Guild members in six U.S. cities, Frank said VDT users lost more time from work than did nonusers, missing more than one-half day more on the average in a two-year period than nonusers.

"While a small difference," he said, "if this is multiplied by the millions of workers involved, the dollar cost in lost-time wages is quite large." More than seven million American workers now use VDTs, according to one estimate, and the figure could reach 40 million by 1990.

Based on 1,000 questionnaires returned from the six cities surveyed, Frank, professor and chairman of the Department of Preventive Medicine and Environmental Health at the

University of Kentucky's College of Medicine, presented the following findings of his study to the Health and Safety Subcommittee:

- "VDT users suffered more from deteriorated vision, eye strain, eye irritation, red eyes and blurred vision than nonusers."

- "VDT users, more than nonusers, suffered from neck pain, shoulder pain and low back pain." This finding, he said, "could not be explained by chance."

- "Headaches were significantly more frequent among VDT users."

- "VDT workers reported being more irritable, having trouble sleeping, having trouble getting up and feeling overworked."

- VDT users also reported "more

often problems of stress and physical design at the work place. VDT users noted more often than nonusers problems with reflections, improper brightness, how one sits and poor equipment."

Frank continued that among women responding to the survey, there "was no evidence of premature birth, infant mortality or effect upon the menstrual cycle with VDT use." He said "no conclusions can be drawn with regard to reproductive effects and VDT exposure since the number of birth defects and miscarriages was insufficient in this [survey] population."

Similarly, the number of respondents precluded arriving at any firm conclusion about possible develop-

ment of cataracts from VDT use, Frank said. He called for additional research on the effects of VDTs and recommended that "an interim standard on work breaks be instituted" in the meantime.

Subcommittee Chairman Rep. Joseph M. Gaydos (D-Pa.) said the panel will "remain sensitive and alert" to the possible problems of VDT use and may hold additional hearings to make "a substantive evaluation of the progress in this area."

Newspaper Guild President Charles A. Perlik Jr. told the subcommittee the union is following up the Frank study with "detailed ophthalmological examinations and the gathering of related information" in the six cities surveyed.

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Reagan Invokes Powers to Retain Export Controls

WASHINGTON, D.C. — President Reagan has invoked national emergency powers to keep in effect U.S. export controls, which lapsed Oct. 14 with Congress still unresolved on renewing the Export Administration Act.

The act, which provides the government with the authority to license U.S. exports, expired Sept. 30, but was extended to mid-October by the House and Senate. After the president's action, Congress last week resumed debate on renewing the export law without the deadline pressure.

Reagan invoked the International Emergency Economic Powers Act to keep the controls in place, saying that "in the absence of controls, foreign parties would have unrestricted access to [U.S.] commercial products, technology and technical data, posing an unusual and extraordinary threat to national security, foreign policy and economic objectives critical to the United States."

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Draft Records to Find Absent Fathers Plan Renews Debate Over Use of Data Matching

By John Gallant
CW Staff

WASHINGTON, D.C. — A plan to use draft registration records to ferret out fathers dodging child support responsibilities has renewed debate over whether computer matching is a legitimate tool for improving government efficiency or an unwarranted invasion of privacy.

In November, the Selective Service System will begin periodically comparing its computerized draft registration records against a list of absent fathers with child support obligations provided by the Office of Child Support Enforcement (OCSE), a division of the U.S. Department of

Health and Human Services. The Selective Service records contain information on some 11 million men between the ages of 18 and 23 who have filed with the agency since draft registration was reinstated in July 1980.

When computers at the federal Joint Computer Center at Great Lakes, Ill., encounter hits, or matches between the two lists, the information in the draft registration files will be forwarded to the OCSE to help the agency track down the delinquent fathers, according to Selective Service spokeswoman Joan Lamb. Because the Selective Service relies on data from other federal agencies,

'People wrongly become the target of an investigation. Their employer will get a letter stating that, while the government isn't saying anyone is guilty, the person is under investigation. And though the person may be subsequently cleared, very often his or her employer is never notified of that.'

such as the Social Security Administration, to uncover those who fail to register for the draft, the agency sees this project as a chance to return the

favor, Lamb said.

"In the interest of equity, we feel we have to do this," Lamb said. "Given that we depend on other agencies, we feel that it's only fair to give them access to our information. The guy who isn't supporting his child is making sure that the taxpayer has to, and that costs the government a lot of money."

But the director of the American Civil Liberties Union's Privacy Project called that rationale "absurd." What the Selective Service is doing, Norma Rollins said, "is making a circular argument. Those initial exchanges of information that the reciprocation is supposedly based on are objectionable also."

The problem, Rollins said, is that "there are errors in the program or in the data provided," so "there are a lot of incorrect hits." When this happens, "people wrongly become the target of an investigation. Their employer will get a letter stating that, while the government isn't saying anyone is guilty, the person is under investigation. And though the person may be subsequently cleared, very often his or her employer is never notified of that."

"There is absolutely no due process involved in the searches undertaken with computer matching."

Warned Rollins, "Because computer technology has boomed, we're creeping toward total government knowledge of all we do. We start by searching through the records of scofflaws and gradually ease into wider access to private information."

Not Alone in Concern

Rollins is not alone in her concern over the growing government use of computer matching. Ronald L. Plesser, former general counsel of the Privacy Protection Study Commission, said in a recent interview, "I don't oppose computer matching totally, but I am troubled that there is no institutional control within the government on this issue."

"The people employing computer matching say that the federal Privacy Act of 1974 is the protector of citizens, but there are loopholes in that legislation that you could drive a truck through," he remarked.

"The government obviously needs computers and telecommunications for information exchange, but when you get into areas like matching agency files against bank records, you have to beware," Plesser cautioned.

"There are absolutely no guidelines to follow. If someone in the government came up to you on the street and demanded to see your bank account, that would obviously be an illegal search and seizure. But, if the government can get that information from a computer, somehow that seems to sanitize it, to legitimize it."

Both Lamb and Rollins admitted that the computer matching done by the Selective Service-OCSE will probably produce little data that is useful. Lamb observed that the pool of youthful draft registrants is unlikely to contain many delinquent fathers.

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Exec Urges Plan to Align DP, Business Strategies

By Paul Gillin
CW Staff

WASHINGTON, D.C. — The data base administration function needs dramatic restructuring if management information systems executives hope to align overall DP functions with business needs.

That was the message that Gene Altshuler, data base specialist and principal at Peat, Marwick, Mitchell & Co., delivered here last week at the Conference on Data Administration and Control of Data Bases. Altshuler proposed that many companies would do well to establish a three-tiered information planning and control structure that "links business strategy with automation strategy."

Information planning and control comprises three basic elements, Altshuler said. Systems architecture administers the data administration functions at the macro level, looking broadly at the business environment and recommending systems that can be integrated with it. "It has the functional user interface that looks down the road at what has to be done and plans the relationships of major systems to other major systems," Altshuler explained.

'User Translators'

This level is also responsible for creating systems acceptance criteria that are more realistic than simply asking the user to sign off on a sheaf of documents. Systems architects are basically "user translators" who are supported by programmers who can turn their translations into useful code, he said.

This function is also responsible for performing feasibility studies, but with enough business savvy to explain the intangible benefits of a project to management.

Altshuler stressed that the current state of information systems development tends to promote good programmers to the task of dealing with users. Lacking that familiarity with the broader requirements of a business strategy, "we get a programmer setting corporate policy with a coding pencil," he said.

Unfortunately, the employees who will be least available in the future are those "who can interact with the users and extract their basic needs." But Altshuler indicated that information architecture will be critical to the data base administration function in future years.

The second major area of information planning and control is the automation planning and control function, which handles the more

technical requirements of the DP installation, Altshuler said. These include coordinating automation plans with requirements set forth in the high-level "enterprise model" of basic business needs; establishing operational plans for automation; planning communications facilities; quality assurance; data administration in the "classic" sense; and project management and control.

Too many of these responsibilities are currently borne at the "factory floor" level under the data administration function, Altshuler said. To be effective, a central control function is needed to coordinate the factory and let it write code. Variances from schedule and quality assurance are better handled by those who can

communicate well with the users.


The third branch of information planning and control is the research and development function. This group looks at new mainframe and peripheral devices, systems and applications software and fourth-generation technologies for possible use in the corporation, he said.

Altshuler noted that information planning and control does not provide for end users' control of their own data, a concept he said is "disastrous" in many organizations. Rather, "it separates planning and control of data from its technical function." If an organization is not satisfied with its data base administration function, "I'm advising you to split it up," he concluded.



CW Photo by P. Gillin

A data base administration structure that "links business strategy with automation strategy" was proposed last week by Gene Altshuler.




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Financial Planners To Meet Nov. 17

OVERLAND PARK, Kan. — "Taming the Microcomputer Revolution," the 1983 Midwest Conference for Financial Planners, will be held Nov. 17 at the Johnson County Community College here.

The conference fee is \$50 for advance registration and \$60 for registration after Nov. 1.

More information can be obtained from Johnson County Community College's Continuing Education Department, 12345 College at Quivira Blvd., Overland Park, Kan. 66210.

Demonstration Described at Conference

Cullinet's IDMS/R Gets High Marks in Preview

By Paul Gillin
CW Staff

WASHINGTON, D.C. — A consultant who has used Cullinet Software, Inc.'s yet-to-be-publicly demonstrated IDMS/Relational (IDMS/R) data base management system (DBMS) last week gave the product qualified approval as a relational DBMS.

Concluding a session on relational DBMS at the Conference on Administration and Control of Data Bases here, William Casey, president of Systemcraft, Inc., said that the product is better than any existing relational DBMS he has seen for building production applications.

While he has long been skeptical about the ability of "third-generation" DBMS like IDMS to provide the ease-of-use functions of relational models in production settings, Casey's experience with IDMS/R, which he worked with last month, has changed his mind. IDMS/R "behaves like a relational DBMS," but has the powerful features of the network-model IDMS, Casey said.

Casey's experience with IDMS/R and other DBMS that have been extensively rewritten to incorporate relational features has convinced him that it is possible to perform a relational retrofit on a "traditional" DBMS and achieve better perfor-

mance than from a true relational model, he said.

Noting that he had worked for Cullinet for seven years until 1980, Casey said that nevertheless he had been skeptical about Cullinet's ability to build a relational view on top of the network IDMS architecture and achieve the benefits of both. However, a demonstration convinced him that the goal was achievable, he said.

"I thought I'd find things I didn't like, and I was surprised," he conceded.

According to Casey, two features of IDMS/R make it preferable for production applications to "true relational" products like Oracle Corp.'s

Oracle and Relational Technology, Inc.'s Ingres: The data dictionaries are "much better," and the integrity safeguards are more comprehensive.

Casey prefaced his remarks by stating that third-generation DBMS have succeeded by virtue of features that were initially thought not to be significant.

These include integrity aids like backup and recovery and application building aids like data dictionaries and screen painters. However, traditional DBMS have suffered from their inability to provide a logical data view that is acceptable to the end user.

Relational systems evolved from a "top-down" approach that started with the logical view, eschewed hard pointers and provided powerful facilities for performing joins and dynamically creating tables. However, the relational products fell short in the quality of data dictionaries they provided, security features and provisions for concurrency control, Casey said.

True relational systems have undergone "a lot of retrofitting" to provide lockout protection and concurrency control, but the results have been largely unsatisfactory, he observed.

In the meantime, several third-generation DBMS suppliers have "entirely rewritten" their systems in the last five years to provide these features.

As a result, the third-generation systems are better suited to production applications under a relational interface, Casey said. He stressed that systems like IDMS/R cannot be called "truly relational," but asserted that purity of definition is not as significant as quality of results.

Rather, the real question is whether the system acts relational as opposed to whether it is truly relational. On that score, the third-generation DBMS turns in a strong performance, Casey said.


Three Locations Chosen to Host DPMA Seminars

TORRANCE, Calif. — The Education Foundation of the Data Processing Management Association (EFDPA) will hold a two-day seminar on "Software Quality Assurance and Verification and Validation" Nov. 28-29 in Atlantic City, N.J.; Dec. 5-6 in Washington, D.C.; and Dec. 12-13 in Boston.

The seminar will be presented by Raymond J. Rubey, technical director at Softech, Inc. It will focus on reviewing design inputs and processes, preparing test plans and procedures, establishing audit trails for problem fixes and following up and managing software change control boards.

The registration fee for the seminar is \$465 for DPMA members and \$495 for others.

Further information is available from EFDPA Seminars, Department SQA, 3420 Kashiwa St., P.O. Box 3608, Torrance, Calif. 90510.




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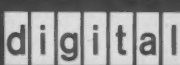
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Datacomm Briefs

Committee Questions Reality of Bypass Threat

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — The "bypass threat" may be more rhetorical than real, the U.S. Senate Commerce Committee suggested earlier this month in a report on S. 1660, a pending bill that would levy surcharges on those who bypass the dial-up telephone network in favor of other transmission services.

The Commerce Committee's argument leaned heavily on an article in the May 1982 *Bell Laboratories Record*. The committee noted that the *Record* viewed bypass "more as a concern than a threat," "because 'it's hard to beat the price' of local-exchange services."

The Commerce Committee report pointed to the ubiquity of the local-exchange network and the fact that large companies are skeptical about the performance of emerging bypass technologies and suppliers. Because of these factors, the committee insisted that S. 1660 would not encourage bypass, at least in the near future.

S. 1660, which is now awaiting a final vote on the Senate floor, is one of two bills which is opposed by AT&T and others, including most business users. The second bill, H.R. 4102, was debated last week within the House Commerce Committee.

AT&T opposes the bills not be-

cause of the bypass surcharge, but because they would charge only business users — not residential users — for access to the long-distance telephone network. Legislatively induced increases in communications charges for business users, AT&T argues, will cause a massive migration to alternate facilities.

Moreover, enactment of the legislation would force AT&T to revise its recently filed long-distance tariffs, an expensive, time-consuming process that would prolong customer confusion and delay completion of AT&T divestiture.

FCC Pushes Up Date Again in Tariff Changes

WASHINGTON, D.C. — Tariff changes promising lower costs for at least some users of AT&T's wideband digital services were again deferred by the Federal Communications Commission (FCC) last week. The effective date is now Nov. 7 instead of Oct. 23.

The tariff changes — originally slated to become effective Aug. 24 — implement a June FCC decision (Docket 81-216) ordering the phone company to:

- "Unbundle" (separate) its charges for digital channels and the attached interfaces, usually referred to as channel service units (CSU) or network channel terminating equipment (NCTE).
- Allow the use of independently

made terminal interfaces.

AT&T filed the changes last July. Customers who continue using CSUs and NCTE supplied by the phone company would pay at least as much as before, but those leasing unbundled channels would pay considerably less.

For example, the channel-only rate for high-capacity Terrestrial Digital Circuits Service, also known as "Accunet T1.5," would be \$120/mo less than the present charge for a channel plus NCTE. Under the new schedule, if the user wants the NCTE, he pays an additional \$170/mo.

For Dataphone Digital Service, the bundled service — channel plus interface — now costs \$99.65/mo to \$908/mo, depending on speed. Under the new tariff, the channel-only rate ranges from \$65.05 to \$873.40/mo and the CSU/NCTE, if acquired from the phone company, costs an additional \$37.40/mo.

The FCC's Common Carrier Bureau last month sent AT&T a long list of questions concerning the tariff changes, and the phone company replied Oct. 11. According to an FCC representative, the tariff is being delayed until Nov. 7 to give the bureau more time to review the reply.

It is widely anticipated that as soon as the new tariff becomes effective, independent manufacturers will unveil NCTE/CSUs at prices below those charged by AT&T. This competition is expected to force down the phone company's prices.

SBS Voices Opposition To AT&T's Billing Plan

WASHINGTON, D.C. — Satellite Business Systems (SBS) recently told the Federal Communications Commission (FCC) that it opposes an "optional billing arrangement" for users of AT&T's Enhanced Private Switched Communications Service (EPSCS), because "effectively, the shared EPSCS network becomes a 'mini-public-switched network' that [offers] per-minute call rates less than half those" of AT&T's Message Toll Service (MTS).

Under the proposed plan, scheduled to become effective Nov. 30, charges for EPSCS service components used in common would be shared. According to SBS, this "would result in the creation of an offering equivalent to MTS."

SBS is particularly upset about the documentation AT&T filed to support its proposal, which it alleged is inadequate. The phone company is "seeking to restructure substantially its EPSCS offering in a manner that avoids commission scrutiny," contended SBS. If the proposal is approved, SBS said, the change will encourage AT&T to submit similar proposals involving other services, thereby "negating" FCC rules designed to ascertain the reasonableness of rates and terms before they are implemented.

MCI Communications Corp. also told the FCC it opposes the EPSCS proposal, pointing out that shared and reduced rates would be offered only to those EPSCS users who lease interexchange connecting facilities from AT&T.

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Cleveland, OH	Nov. 15
Columbus, OH	Nov. 18
Corpus Christi, TX	Nov. 16
Detroit, MI	Nov. 3
Green Bay, WI	Nov. 22
Greensboro, NC	Nov. 17
Greenville, SC	Nov. 16
Harrisburg, PA	Nov. 22
Knoxville, TN	Nov. 2
Lexington, KY	Nov. 2
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Meadowlands, NJ	Nov. 30
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Merrimack, NH	Nov. 1
Milwaukee, WI	Nov. 23
Minneapolis, MN	Nov. 29
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New York, NY	Nov. 9
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Orange County, CA	Nov. 16
Orlando, FL	Nov. 10
Ottawa, ONT	Nov. 24
Piscataway, NJ	Nov. 1
Pittsburgh, PA	Nov. 1
Portland, OR	Nov. 1
Quebec City, PQ	Nov. 30
Regina, SASK	Nov. 15
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Problems Brewing for Fault-Tolerant Vendors

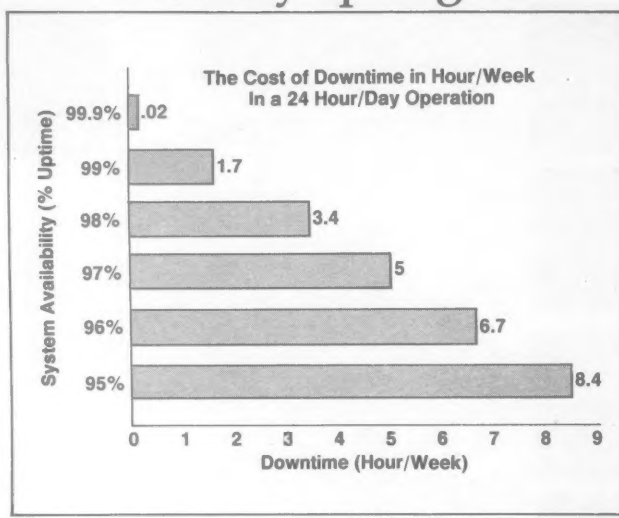
(Continued from Page 1)

Aided by the great technical difficulty that traditional mainframes have encountered in adding fault tolerance to existing product lines, feisty start-ups and venerable "old-timers" like Tandem (founded in 1974) seem headed for blue-sky futures. But problems have begun bubbling to the surface, adding some confusion and uncertainty to the brewing fault-tolerant pot.

While there is no shortage of innovative architectural approaches to providing fault tolerance (see story Page 19), there is a very limited number of OEMs — maybe a dozen — currently buoying the fault-tolerant market. Because most fault-tolerant system makers lack any sizable end-user sales capabilities, the competition for OEMs is growing increasingly heated — "cutthroat," in the words of one market analyst.

Also, while the traditional computer makers have largely shunned the fault-tolerant market, their customers are increasingly being drawn to applications and operating environments requiring fault-tolerant features. So it is generally conceded that within a few years, major vendors like IBM and Digital Equipment Corp. will offer redundant, fault-tolerant features in a number of mainstream systems. Indeed, many analysts believe that successive generations of IBM and DEC systems may offer complete fault-tolerant ar-

Industry Spotlight



chitectures without excluding users from the wealth of applications software already written for their systems.

The on-line transaction processing and office automation markets that most fault-tolerant players have targeted are now dominated by the tra-

ditional vendors. Users in these markets have made prodigious investments in applications software to run on the hardware of IBM, DEC, Burroughs Corp. and the like, none of which can be used on the machines of the fault-tolerant makers, according to Omri Serlin, a research

consultant in Los Altos, Calif.

"This transaction processing market is a very, very difficult place to sell into, especially when you are not compatible with IBM or DEC architectures," Serlin said. "The market potential is huge, but sales are tough — getting tougher, I believe."

Finally, while hardware problems in providing fault tolerance have largely been ironed out, most system failures are software-related. A tremendous and costly effort must be made in software development to produce systems that are truly fault tolerant.

"A great challenge to the fault-tolerant companies lies in the implementation of high reliability without degrading CPU performance or overburdening application programmers," said Richard J. Matlack, president of Infocorp, a Cupertino, Calif., research firm. "This can be a very expensive undertaking for a small company."

The potential pitfalls notwithstanding, the sheer enormity and growth of the market segment requiring fault-tolerant capabilities is likely to continue to attract new vendors, while coaxing existing companies into the fault-tolerant arena. As Serlin put it, "The need for increased reliability will truly be tremendous in the near future. In a fault-tolerant market of the size most people foresee, there will be room for many good companies."

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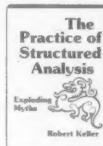
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FAULT-TOLERANT MARKET — KEY PLAYERS AND THEIR PRODUCTS

Company and Address	Product Name	Status	CPU Type	Operating Software	Mode of Recovery After Failure	Target Markets	Price Range
August Systems, Inc. Tigard, Ore.	Series 30 Series 300	Shipping Since October 1981	Intel 8086s Running Same Code in Fault- Tolerant Mode	Jointly Developed Proprietary System (Trigard + Tridac)	Uses "Voter" and Triplating CPUs; Programs Held in Main Memory	Process Control And Communication Control	\$55,000+ (30) \$85,000+ (30C)
Computer Consoles, Inc. Rochester, N.Y.	Power 5/55	Customer Shipment by Year's End	As Many as Eight Motorola 68000s	Proprietary Unix Look-Alike Called Perpos-P (Perpetual Processing OS)	All Major Components Fully Redundant and Operating Simultaneously	Office Automation, Federal Government	\$180,000+
Parallel Computers, Inc. Santa Cruz, Calif.	Not Available	Prototype: Plan To Ship in First Quarter 1984	Motorola 68000- Based	Unix	Utilizes Tightly Coupled Multi- Processors to Avoid "Warm Backups" and Checkpointing	General Business Market	Not Available
Sequoia Systems, Inc. Marlboro, Mass.	Not Available	Prototype	Motorola 68000- Based	Enhanced Version of Unix	Self-Checking Hardware and Operating System Controller Recovery	On-Line Transaction Processing	\$133,000+
Stratus Computer, Inc. Natick, Mass.	Stratus/32	Shipping Since January 1982	Up to 32 Processing Modules in Ring Network; Motorola 68000-Based	Proprietary System Called Virtual Operating System (VOS)	Solidly Hardware- Based; Each Board Has Two Sets of Logic Components, and All Components Are Self-Checking	On-Line Transaction Processing and Office Automation	\$140,000+
Synapse Computer Corp. Milpitas, Calif.	N+1	Shipping Since May 1983	As Many as 28 Motorola 68000-Based CPUs Tightly Coupled Using a 32-Bit Bus to Share Memory	Proprietary System Called Synthesis	Available Working Processor Picks Up Checkpointed Transaction in Shared Memory	Transaction Processing; Financial Community	\$340,000 to \$4.3 Million
Tandem Computers, Inc. Cupertino, Calif.	Nonstop II	Shipping Since 1976	Proprietary 16-Bit CPU Architecture; Up to 225 Processors Can be Linked via Fiber Optics	Proprietary System Called Guardian	Parallel Process in Working CPU Picks Up Last Good Transaction Via Tandem's Dynabus	On-Line Transaction Processing	\$200,000+
Tolerant Systems Corp. San Jose, Calif.	Eternity	Will Ship in Second Quarter 1984	Based on National Semiconductor Corp. 32032	Berkeley 4.1 Version of Unix	Load Shared by Multiple Processors Within Each of Up to 15 Modules	Transaction Processing	\$100,000+

CW Chart

No 'Me-Too' Systems in Fault-Tolerant CPU Market

By Bill Laberis
CW Staff

"What's amazing to me is the wide range of solutions becoming available for the same problem, namely providing fault tolerance at a reasonable cost," said Omri Serlin, president of the Los Altos, Calif., consulting firm of Iton International Co. "It's hard to say who has the best architecture. Actually, not that many have faced the test of the market to enable making any comparisons."

Unlike the personal computer market, which is increasingly crowded with "me-too" vendors, the burgeoning fault-tolerant market is characterized by considerably more product differentiation. The dozen or so vendors purporting to be fault-tolerant systems makers, few of which have shipped anything to date, generally address slightly different market segments with varied approaches to fault tolerance.

What follows are characteristics of several vendors' fault-tolerant machines:

Tandem Nonstop II. The undisputed market king of fault tolerance today, Tandem Computers, Inc. was the pioneer of nondisruptive, on-line repair. Tandem just last week introduced its first 32-bit entry; the following comments therefore refer to the products composing Tandem's present installed base of nearly 4,000 processors.

The Nonstop II can contain up to 16 loosely coupled, 16-bit processor modules, with processors intercon-

nected by two independent 13M-byte buses — the highly regarded Dynabus. Using the proprietary Guardian operating system, Dynabus makes the multiprocessor architecture virtually transparent to the applications programmer, a major breakthrough achieved two years ago with software facilities, most notably Pathway and TMF.

Each processor in a Tandem system is paired with another processor, which assumes the whole processing load should the first processor fail. Each processor continually informs the other what it is doing by sending so-called "I'm alive" messages across the bus. This communication, called checkpointing, enables the backup processor to fill in for its failed partner within two seconds of a reported failure.

But checkpointing has its drawbacks. It is a drain on processor resources and results in some system degradation.

On the plus side, the Tandem approach works well in distributed environments because the independent processors can be scattered throughout a network while maintaining fault tolerance within the whole system.

Synapse N+1. Unlike the Nonstop, the Synapse Computer Corp. N+1 is a tightly coupled system featuring a shared memory linked to a

high-speed bus. The system gets its name from its basic design, which adds an extra Motorola, Inc. 68000-based processors to a system with 'N' processors, the design theory being that the requirements of fault tolerance can be met with one extra of each type of resource.

The Synapse multiprocessors appear as single processors to applications programmers. The proprietary Expansion Bus consists of independent buses that have an aggregate transfer rate of 64M byte/sec, with each bus representing a backup for the other. The system is said to permit relatively easy expansion.

Stratus/32. Considered to have the most hardware-intensive approach to fault tolerance, Stratus Computer, Inc.'s 32-bit architecture essentially quadruples all major hardware components. Each processor board contains two 68000 processors and a hardware comparator, which analyzes the performance of subsystems running in synchronization.

Should the comparator detect a fault from subsystems running in sync, the faulty board is isolated from the rest of the system, while the remaining duplexed board carries on the processing. When the faulty board is repaired, it is reinserted and automatically synchronized with its partner.

Here again, modular expansion to up to 32 processing modules is reportedly accomplished easily. As one study put it, "Stratus offers one of the more cost-effective, fault-tolerant solutions because of its heavy reliance on off-the-shelf hardware, which is rapidly declining in cost."

Computer Consoles Power 5/55. After selling fault tolerance to the telephone directory assistance market, Computer Consoles, Inc. is now targeting the office automation area. The 68000-based system consists of processors connected to a duplexed local-area network (instead of a high-speed bus), also attached to disk controllers.

Perhaps most interesting about the Power 5/55 is its ability to support multiple versions of a data base while allowing users to read from or write to any disk. In addition, full connectivity among processors and other system components yields, de facto processor duplication.

Tolerant Systems Eternity. Tentatively scheduled for mid-1984 shipment, Tolerant Systems Corp.'s Eternity system will be based on flexible System Building Blocks (SBS), with each block capable of performing in any of three functions — applications, communications or file service. Based on National Semiconductor Corp.'s 32032 microprocessor, Eternity will employ a version of Unix operating software, fast gaining popularity among fault-tolerant system makers because of its applications flexibility.

Industry Spotlight

MIT Program Combines Technology, Business

CAMBRIDGE, Mass. — The MIT master's program in the management of technology was organized to serve the increasing needs of industry and government for technological leadership and to educate today's key technology managers, explained Edward B. Roberts, program director and the David Sarnoff Professor of Management of Technology.

The one-year program is divided into three semesters and is taught by both professors of management and professors of technology. Among the technological issues covered by the program are emerging technologies, the legal issues of biotechnologies, supervising technical people, technical planning and project management, government regulations and industrial policy, said Rick Bullen, a partner in Bullen Management Co. of New York.

In addition to the permanent staff, the course incorporates "countless special guests" and field trips to industrial sites, according to Bullen and Elliot Blackman, both members of the first graduating class.

Blackman, a senior scientist at Bolt, Beranek & Newman, Inc. prior to joining NEC Electronics U.S.A., Inc. as a project manager, added that the program "provided technical skills and tools of business, including the ability to do, not just manage people."

Despite the emphasis on technology, Bullen received "more of a business education than you'd expect, which turned out to be good." However, he and Julian Nikolchev, a technology consultant with SRI International, Inc.'s Technology Management Innovation Center, agreed that the management aspects of the program are better geared toward students who had held some managerial or leadership positions.

Without this background, students "probably would not perceive the need for some aspects [of the program] or understand how to employ it unless they had to cope with it," Bullen said. Also, he warned the program "was probably not that great as a stepping-stone for those wishing to

escape from a purely technical track in their career to a purely managerial [track]."

In addition to the structure of the program, the graduates derived a great deal of knowledge from their interaction with each other, which "wears well over time," Blackman said. The students represented a wide range in age, training and professional backgrounds.

"It was really rewarding," agreed Carol Lemlin, a former engineer and now a software manager for Tera-dyne, Inc. Her classmates "developed an *esprit de corps* to cope with the intensity" of the program, Lemlin said, adding that she represented the bottom of her class in terms of technical experience (five years).

Most of her classmates had 10 years of experience or more.

The graduates also emphasized that the MIT program will cost students at least a year out their personal and professional lives. "You have to consider that you'll be replaced in your job," Bullen warned. And tuition and living expenses combined can easily run at least \$25,000 to \$27,000 for a single adult.

Nonetheless, the career advancement benefits offered by the program were considered well worth the investment by the graduates recently interviewed by *Computerworld*, all of whom appeared pleased with the end results of their studies — new jobs with increased responsibility, visibility and pay.



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By Patricia Keefe
CW Staff

CAMBRIDGE, Mass. — A number of technical professionals have advanced to key decision-making positions despite their lack of an MBA or other advanced business credentials. All are recent graduates of MIT's two-year-old master's program in technology management, which combines business and management theory with a technical focus.

In recent interviews, however, some of the program's graduates told *Computerworld* that it had not been easy to get those jobs because the concept behind the program is so new that many people do not understand it.

The master's degree program, con-

ducted jointly by the School of Engineering and the Sloan School of Management, focuses on the management of technology and technological innovation. "The program offers a viable and long-overdue alternative to an MBA program for the technical professional whose career path demands increasing management responsibility on the technical side of the organization," explained Edward B. Roberts, program director and David Sarnoff Professor of Management of Technology.

Those who enter the program must possess an undergraduate science or engineering degree and five to 10 years' working experience. Typically, the graduates interviewed

were self-sponsored, possessed undergraduate degrees in physics, engineering or mathematics and had worked 10 years in their fields. Nearly all had started their careers in purely technical positions, later moving into leadership roles that increasingly required an understanding of people and project management.

Some students, like Rick Bullen, a former department manager at Ford Aerospace and Communications Corp., simply found themselves "doing technical management with no formal training in it." Bullen is now a partner in Bullen Management Co., an investment firm in New York City. "I wasn't interested in an MBA program per se, although I had looked at them 10 years earlier," he

explained.

The "depth and breadth" of the MIT program surpassed that of some two-year industrial management programs, he added.

Other students, like Elliot Blackman, now a project manager with NEC Electronic USA, Inc., and Julian Nikolchev, a former mechanical engineer who now works as a technology consultant for SRI International Inc.'s Technology Management Innovation Center, wanted to gain a better understanding of the business side of their work and had considered MBA programs, but chose the MIT degree for its focus on technology.

These and other graduates entered the program having either considered or committed themselves to not returning to their old jobs. Alumnus Ken Miller entered the MIT program after noticing he was not being considered for some positions because he lacked "an advanced business credential of the MBA type." Or, as Teradyne, Inc.'s software manager Carol Lemlin explained, "My career wasn't maturing fast enough."

"The program has helped make me more broad-based," Nikolchev said, adding that he now knows better how he "fits into the corporate base." However, corporations do not appear to have as clear an idea of how the MIT graduates fit into the company picture.

"It's hard to convince some recruiters that they can benefit from a program that integrates technology and management," Blackman said.

Also, the recession may have made some companies leery of deviating from traditional MBAs, believes Miller, a product engineering manager with Duracell, Inc.

Nearly all the graduates complained that job interviewers tended to see them as people with either technical or business skills. In addition, many of the interviewers were younger and possessed less experience than their prospective employees. High-level managers, according to Nikolchev, are more likely to "see the importance of [your] skills and know how to utilize them."

More information about MIT's advanced degree in the management of technology is available from Program Manager Jane Morse, MIT, E52-125, 50 Memorial Drive, Cambridge, Mass. 02139.

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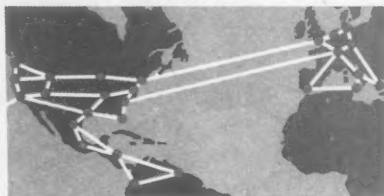


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What Makes a Good OA Consultant?

Q I would like to plan for a career as a DP consultant specializing in office automation.

I have four years of experience in planning and am currently involved with minis and micros in office automation. What are the rewards and pitfalls for consultants in office automation?

A The demand for good office automation consultants is and will remain high. The problem is that anyone who has sold, used or seen an IBM Displaywriter has become a consultant and proclaimed himself an expert in office automation. As a result, the good consultants have a tough time con-

vincing confused buyers of their worth.

An OA consultant should have a specialized expertise to market. The good ones will have an in-depth knowledge of how to integrate existing computer-based systems with the various facets of office automation.

The most difficult problems faced by office automation consultants are not technological. They are computerphobic — the reluctance of secretaries to part with their typewriters, management's resistance to learning keyboarding skills and top management's doubt that office automation deserves a higher priority.

If you have the technological skills and the ability to integrate and if you can successfully cope with

these attitudes, the rewards are high. The most common pitfall is to sell expertise that you don't have. Sooner or later you have to produce.

Q I am looking for a position that will allow me to apply my previous experience in DP management and systems analysis to the social and human problems of automation. Specifically, I'm interested in work related to the analysis and development of national policies with regard to computer technology. Do you have any suggestions about where I can start?

A The time is ripe for some meaningful legislation on computer technology. Our

Turnaround Time

By Larry E. Long



national policies and laws are inadequate to deal with the abuse of this technology. During the next several years, our legislators must come to grips with the paucity of laws and policies regarding computer technology.

Much-needed technology-related legislation has been given a low priority because legislators and their staffs address those areas in which they have interest and expertise. People on Capitol Hill have admitted serious knowledge deficiencies in computer-related areas, but to date have done little to remedy the situation. I'm optimistic that some senator or representative will view your application favorably and, perhaps, use your expertise as a springboard to enacting new legislation.

Q I am writing to you about your answer to a reader who wanted to set up a DP library. Your suggestions for basic services were useful, but you didn't mention the real key to organizing a productive DP library.

The first thing to be done is to hire a professional librarian whose master of library science degree has provided knowledge of both library services and data processing.

You can't expect a promoted operator to perform the functions you suggested with any degree of competence. If, as you say, "The importance of the information resources library cannot be overstated," then it would seem worth having the job done by a qualified person.

A I responded to a question about how to set up an information resources library, not who to hire. Your point is well taken, though a bit oversimplified.

Just as programmers are somewhat reluctant to transfer from management information systems (MIS) to functional area departments, formally educated librarians are reluctant to consider positions in MIS. I polled a half dozen recent library science graduates. In reality, the extent of their formal DP education is more awareness than "knowledge."

Two things need to happen before library specialists become an integral part of MIS.

First, library science curricula need to devote more time to MIS topics.

Second, MIS managers need to be made aware of what a well-run information resources library means to effectiveness and productivity.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.



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Managers on the Move

CHARLES W. CURRIER, ROBERT J. FERRARI and REBECCA L. DE LUCA have been appointed to new positions within the data processing department at GTE Lighting Products in Danvers, Mass.

Currier was named data center manager. He joined GTE in 1966 and

since that time has held a number of DP and finance posts. From 1976 to 1980, he was project supervisor of financial applications; most recently he served as DP program manager for marketing and finance. He graduated from Chamberlayne Junior College in Boston and attended Mer-

rimack College in North Andover, Mass.

Ferrari has been named DP program manager/marketing and finance, replacing Currier. He joined GTE in 1976 as a computer programmer and has held a number of related positions since that time. In 1981, he

was promoted to project supervisor and earlier this year to DP program manager. Ferrari graduated from Northeastern University in Boston with a B.S. in business administration. He also recently received an MBA from Rivier College, Nashua, N.H.

DeLuca has been named DP program manager for billing and price/policy, succeeding Ferrari. She joined GTE in 1980; prior to that, she was with American Optical Corp. She received a B.A. degree in mathematics from the University of New Hampshire.

...

THOMAS C. MINARD has been promoted to manager of computer services for National Grange Mutual Insurance Co. (NGM) in Keene, N.H. In his new position, he will be responsible for all NGM computer services, which include data file management, security, contingency planning, hardware systems, computer processing and distribution.

Minard began his career with NGM in 1973 as a management trainee. He has held a number of different positions in the premium accounting department including billing manager and, most recently, production control manager for data center operations.

He graduated from Keene (N.H.) State College with a bachelor's degree in education and recently earned a bachelor's degree in science as a business major from Franklin Pierce College, Rindge, N.H.

...

ROGER G. BAST has been appointed manager of corporate computing facilities for Air Products and Chemicals, Inc. in Allentown, Pa. Bast will manage all computing services in the company's information services organization.

Bast joined Air Products in 1972. He was manager of management sciences prior to his recent appointment.

He holds both a B.S. and M.S. degree in management sciences from Lehigh University, Bethlehem, Pa.

...

PAUL PAVLOFF has joined Kimberly-Clark Corp. in Neehan, Wis., as a senior staff vice-president with responsibility for management information services and business systems.

Pavloff was formerly with Armco, Inc., where he was corporate director of information resources management. Prior to that he was vice-president in charge of management information services at Champion International Corp. Pavloff earned a BBA in accounting from the University of Pittsburgh (Pa.).

...

WAYNE A. CALLEN has recently named vice-president of data processing at Great American Federal Savings and Loan Association in Whitehall, Pa. He is overseeing all the in-house data center's DP operations.

Callen, who has been with Great American since 1975, was formerly assistant vice-president in the same department.



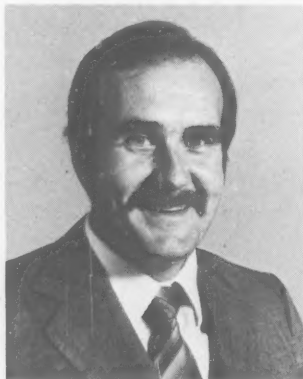
Charles W. Currier



Robert J. Ferrari



Rebecca L. DeLuca



Thomas C. Minard



Roger G. Bast



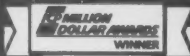
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- 10 Manufacturer (other than computer)
- 20 Finance/Insurance/Real Estate
- 30 Medicine/Law/Education
- 40 Wholesale/Retail Trade
- 50 Business Service (except DP)
- 60 Business Service (except DP)
- 65 Public Utility/Communication Systems/Transportation
- 70 Mining/Construction/Petroleum/Refining
- 75 Other User

Vendor

- 80 Manufacturer of Computers, Computer-related Systems or Peripherals
- 85 Computer Service Bureau/Software/Planning/Consulting
- 90 Computer/Peripheral Dealer/Distributor/Retailer
- 95 Other Vendor

2. OCCUPATION/FUNCTION (Circle One)

- 12 VP/Assistant VP
- 13 Treasurer/Controller/Financial Officer
- 21 Director/Manager/Supervisor DP/MIS Services
- 22 Director/Manager of Operations/Planning/Admin.
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 35 Programmer/Methods Analyst
- 36 Chief Programmer/Systems Supervisor
- 38 Data Comm Network/Systems Mgmt
- 41 Engr./Scientific/R&D/Tech Mgmt
- 51 Mfg Sales Reps./Sales/Marketing Mgmt
- 61 Consulting Mgmt
- 70 Medical/Accounting Mgmt
- 80 Educator/Journalist/Librarian/Student
- 90 Other

3. COMPUTER INVOLVEMENT (Circle all that apply)

- A. Mainframes/Supernodes
- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
- D. Computer Peripherals
- E. Office Automation Systems

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GSA Study Outlines Initiatives To Handle End-User Computing

WASHINGTON, D.C. — Because there are 18,000 general-purpose computers in the federal government and because about 210,000 personal computers will be installed by the end of this year, the U.S. General Services Administration's (GSA) Office of Information Resources Management has set forth some initiatives to deal

with the management problems that end-user computing may bring. The initiatives are spelled out in a recently released report titled "Managing End-User Computing in the Federal Government."

As part of a governmentwide program, the GSA will provide transitional leadership in the implemen-

tation of end-user computing through its Managed Innovation Program. The program, which is scheduled for complete implementation by the end of 1984, has been established to head off problems commonly associated with a sudden influx of end-user computing.

Among the problems cited by the study are data incompatibility, a loss of data control, a loss of data security and an inefficient use of data.

Buyer's Guide Planned

To ensure that federal agencies purchase hardware and software "at favorable prices and in a timely manner," the GSA will develop a buyer's guide for equipment and software procurement and a simplified road map of government regulations. The buyer's guide will provide a better method "to distribute information concerning equipment and software to the thousands of functional managers in the government," according to the study.

The road map of regulations will be a step-by-step "how to" document to deal with the government's complex rules and policies.

Also under development by the GSA to assist federal agencies are commercially operated computer stores in government buildings and a local data network policy to solve incompatibility problems, according to the study.

"At the present time," the study said, "the federal government manages all information systems and their technology with processes developed over the past 15 years."

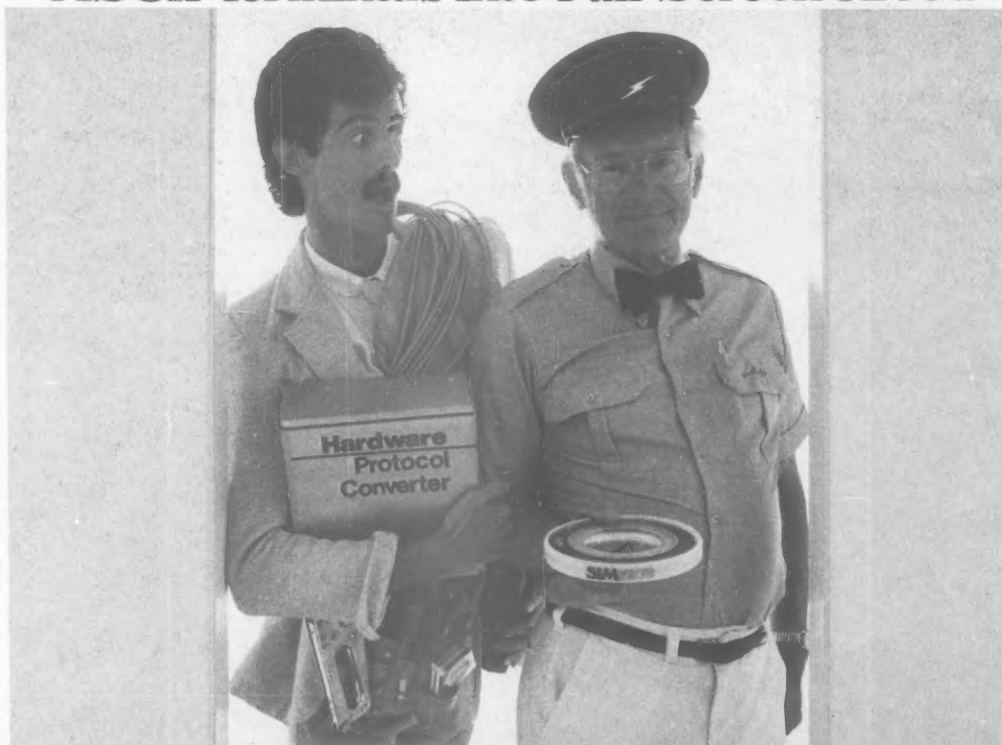
"End-user technologies, particularly personal computers, need to be managed somewhat differently than large, complex and costly ADP systems," the study said.

Government agencies were also urged by the report to identify prospective classes of uses and users. The formation of compatible special interest groups is encouraged by the report, as are support structures to assist novice users.

Although warning against premature standards that could do more harm than good, the study advocated that agencywide standards for hardware and software be considered.

Also suggested was the development of a strategic plan for end-user computing, as well as a review process, a program for user assistance and education.

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Wanted: Your Thoughts On Applications Software

Faced with tight deadlines, large backlogs and slim programming budgets, many DP installations are turning to packaged applications to provide a quick and cost-effective solution.

In the Jan. 30 issue of *Computerworld*, a Special Report on "Applications Software Packages" will look at the issue of choosing and modifying packaged applications to fit particular business needs.

Your input for this special section is welcome. Articles should be in the form of tutorials that offer advice or opinions on specific topics (but are not product-specific) or in the form of application stories that describe your experiences with particular products.

Articles should be four to six pages, typed and double-spaced. Longer articles will be given lower priority and may be heavily edited. Black-and-white photographs as well as camera-ready artwork are welcome.

The deadline for all submissions is Wednesday, Nov. 30.

Further information and a one-page listing of guidelines and possible topics can be obtained from John Gallant, Staff Writer. Manuscripts should be sent to him at *Computerworld*, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

ACM's Annual Conference To Get Under Way Today

NEW YORK — Sen. Frank R. Lautenberg (D-N.J.) will deliver the keynote address at the Association for Computing Machinery's (ACM) Annual Conference, which opens here today at the Sheraton Centre Hotel. Lautenberg's address will focus on the role of government in promoting the use of computers in education, science and business.

A special Educators Program will feature three days of panels and prepared papers. The chancellor of the New York City school system will speak on "Introducing Computers in the Classroom."

Other topics of discussion

for this program include "Implementing a Computer Program in the Classroom," "Funding Computers in the Classroom" and "Assessing Computers in the Classroom."

The conference will also feature technical sessions, an exhibit of computers and computer-related products and the Fourth World Computer Chess Championship.

Registration fees are \$120 for members, \$160 for non-members and \$25 for students. Additional information on the conference is available by contacting the ACM, which is located at 11 W. 42nd St., New York, N.Y. 10036.

ICCP Chooses Baltimore For 10th Anniversary Meet

CHICAGO — John Swearingen, director of technical services for the U.S. Senate's Rules and Administration Committee, will keynote the Institute for Certification of Computer Professionals' (ICCP) 10th Anniversary

Celebration. The celebration will be held in Baltimore on Nov. 3.

Swearingen will speak on "The Real World of Certification," an ICCP spokesman said. He cochaired the Computer Foundation Organizing Committee which led to the establishment of ICCP by eight national and international computer societies in August 1973 and served as the institute's first president.

As international vice-president of the Data Processing Management Association, Swearingen developed the Certificate in Data Processing program which was initiated in 1962.

Reservations for the ICCP 10th anniversary dinner may be made by mailing a check for \$25 payable to ICCP, 35 E. Wacker Drive, Chicago, Ill. 60601.



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International Report

FROM THE CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

ARTARMON, N.S.W. — In the wake of Osborne Computer Corp.'s financial collapse in the U.S., Osborne's Australian subsidiary has closed its doors and is selling off all its assets. Richard Graham, managing director of Osborne Computer Corp. Pty. Ltd., said the order to shut down came as a surprise, but the U.S. parent company apparently wants to liquidate as many assets as possible.

BRISBANE — Mincom Pty. Ltd. made its move into the U.S. software market with the introduction of its Integrated Mine Management System for the coal mining industry. The package, which Mincom developed for Prime Computer, Inc.'s Prime 750 and 850 computers, is being modified to run on IBM 4300 and 30 series machines.

CANBERRA — The leader of a visiting delegation from the Japanese Software Industry Association (JSIA) announced that there are many opportunities for Australian software sales in Japan. Kazuro Fujimoto, president of JSIA, said Japan needs more packaged application software and systems generators to help correct the island nation's huge dependence on custom-built software. He also called for the establishment of a Western Pacific Basin Association for the exchange of information.

HOBART, Tasmania — A feasibility study under way here is examining the potential establishment of an Australian National Computing Center in Tasmania. The Tasmanian government and the head of the UK National Computing Center are jointly coordinating the project.

CHINA

BEIJING — The recent 1983 International Conference on Chinese Information Processing illustrated China's strides in Chinese character processing. A high-speed laser printing technique developed at Beijing University, as well as 34 different Chinese-made information systems, was on display at the event, sponsored by the Chinese Information Processing Society.

BEIJING — China is planning to install a computerized traffic control system within the next year. According to the contract specifications, the system must be suitable for a city with a population of up to one million people and must include a well-equipped control center, 360 traffic light controls and the ability to handle 100,000 automobiles. Negotiations are presently being conducted with both Chinese and foreign vendors.

ENGLAND

LONDON — British businesses are slow to embrace new technology, according to a recent study conducted by PA Technology, a division of PA Consulting, Inc. The survey, which polled 100 British firms, showed that only 45% of these com-

panies had introduced a new product within the past year. In addition, half said they were dissatisfied with the speed of their new product development efforts.

FRANCE

PARIS — The French software house Erli has introduced an interactive natural language software package that reportedly enables IBM data base users to query the computer in French. The software, called Saphir, is being compared to IBM's Intellect package.

PARIS — The French Minister of Industry, Laurent Fabius, recently

implemented a series of government policies to help French computer-aided design and manufacturing and robotics vendors, which he believes will help French industry in general. He announced that \$13 million is being targeted toward research and development efforts in these areas.

JAPAN

TOKYO — Nippon Electric Co., Ltd. and NEC Home Electronics Ltd. have jointly released the PC-9801F and the PC-100 series, two 16-bit personal computers that are each priced at \$2,765. The PC-9801F is an enhanced version of the PC-9801 and reportedly achieves twice the latter's

processing speed; it includes a display, two floppy disk drives, an 8-16-bit CPU and keyboard. The PC-100 Series features a mouse, keyboard, color display and two floppy disk drives.

TOKYO — Apple Computer Japan, Inc. and Canon Sales Co. have signed a contract that will allow Canon to sell Apple microcomputers. Canon plans to establish a dedicated Apple sales force of 100 people in Japan.

TOKYO — Canon, Inc. has introduced an image processing system (Continued on Page 31)



State DP Centers Back to Work Day After Fire

By Peter Bartolik

CW Staff

OLYMPIA, Wash. — A severe blaze in a state agency building here earlier this month threatened two computer centers that service client groups across the state. While some offices in the building were displaced, one of the computer centers was back in operation the same day, and the other was back on-line the day after.

Fire was discovered at the Washington Department of Social and Health Services at about 5:45 a.m. Oct. 12, according to Jack D. Morris, chief of the Office of Information Systems. By 6:30 a.m., Morris said, the Sperry Corp. 1100/83 in the east wing of the building had been

powered down to protect data and covered with plastic to prevent water damage.

An orderly "pulled the plug" on the IBM 3043 in the west wing, and there was some file damage, according to Morris.

The fire started on the third floor of the northwest wing of the building, which has a total of eight wings containing some 1,200 to 1,400 workers. "It was a very bad fire that totally wiped out two wings of the building," Morris told *Computerworld* the day after the conflagration.

The Sperry 1100/83 was powered up and back in service by 2 p.m. the day of the fire, he said. The file damage to the IBM was recoverable through backup storage, and that

system was back in service by 3 p.m. the next day.

There was water damage to some terminals located in the building.

Morris said that efforts were under way to determine which had been damaged and would need to be replaced.

International Report

(Continued from Page 30)

called the Canon Compound Electronic File System that reportedly combines microfilm and optical disk technologies. The system consists of a controller, document reader, optical disk drive, laser beam printer, electronic micro scanner and a refined electronic photo display that enables operators to use both 7.4G-bit optical disk and microfilm as re-

cording media. The system will be made available during the fourth quarter of 1984 for around \$42,000.

SWEDEN

STOCKHOLM — Sweden's ambivalent attitude toward government use of large data bases was evidenced here recently over a proposed census and address system called Fobalt, which is under consideration. The Fobalt data base would be comprised of information taken from a number of different data bases, a practice that is frowned upon by the Swedish data protection agency called Datainspektionen. The data base is being pushed by Sten Johansson, the head of the Swedish Central Statistics Bureau, who reportedly wields much influence with inner-party circles. Because of the far-reaching implications and big-brother overtones of such a data base, the Fobalt question will be decided by the Swedish parliament.

STOCKHOLM — The International Federation for Information Processing has established a special committee on DP security and has elected Swedish consultant Kristian Beckman to be the committee's first chairman. Beckman said one of the committee's initial tasks will be to promote DP security education, and the University of Stockholm here has already volunteered to develop a university-level security program.

WEST GERMANY

MUNICH — Computer-aided design and manufacturing (CAD/CAM) will play a major role during the Systems '83 conference currently taking place here. There will be a simultaneous congress paralleling the main fair on CAD in manufacturing. Insiders feel CAD/CAM and graphics will be as important in this decade as was the development of business applications during the 1970s.

Directory Details 1984 Info Sources

WASHINGTON, D.C. — The Information Industry Association is offering prepublication copies of its annual directory, "Information Sources 1984."

Subjects covered in the publication include abstracting services, business information, clearinghouses, computer software, consulting services, data base processors and vendors, document acquisition, education and training, forecasting, government information, literature searching, market research, networking, teletext and videotex.

The publication costs \$39.95 until Feb. 29 and \$49.50 after that date from the Information Industry Association, Suite 400, 316 Pennsylvania Ave. S.E., Washington, D.C. 20003.

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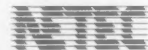
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Info '83 Seminar Targets Selection of DP Systems

By Lynn Haber
CW Staff

NEW YORK — To help ease the confusion that many businesses face when confronting the vast computer product market, a seminar on "Selecting a Business Data Processing System" was offered for the fifth year in a row at the recent 10th International Information Management Exposition & Conference (Info '83) here.

"Buying a computer is not something for an amateur," and "first-time users should rely on professional advice and assistance," David A. Anderson, a senior consultant for Verbit & Co. of Bala-Cynwyd, Pa.,

told an audience of about 30 business executives from manufacturing, distribution and nonprofit organizations. "This will increase your success rate from 15% to 20% to 80%, 90% or 100%."

He also explained that a business must have "good reasons" for wanting to computerize and that investment in a data processing system is not for everyone.

Some of the benefits of computerizing, according to Anderson, include improved clerical productivity, faster order processing, faster billing, improved payables processing, improved inventory control, improved product planning, improved warehousing and distribution control and improved control of sale efforts.

Warns Against Expecting Miracles

Anderson explained how computers are a tool to supply better information and help solve problems, but warned prospective investors against expecting miracles from modern technology.

"Computers are a tool," he said, "but if your house isn't in order before you computerize, you are going to be frustrated by bringing in a computer." He then went on to the define the "Gigo" theory — garbage in/garbage out.

The checklist of events and a discussion of their relevance to selecting the right data processing system included: a comparison of micros and minis; a look at various vendor approaches to selecting applications software; the turnkey or OEM approach versus the multiple vendor approach to buying a minicomputer system; and how to computerize — procedural selection steps from needs assessment to negotiating and signing an agreement.

Anderson said the key to buying a data processing system is buying an application software package.

"People often buy their system backward. They say they want this manufacturer's product or that one's. ... First you have to know what you want your system to do," Anderson said.

Turnkey or OEM Approach

For first-time buyers interested in purchasing a minicomputer system, Anderson recommended the turnkey or OEM approach because it entails less effort for the buyer to deal with one entity that supplies both hardware and software and because there is a greater guarantee that the hardware and software will be compatible.

According to Anderson, buyers looking for immediate financial gratification from investment in a computer system, which "by the time you bring it in ends up double the original estimate costs," will be disappointed.

"You're almost never going to be able to cost-justify purchasing a computer," Anderson said. "The real area of savings will be in the future."

Presenting a case study of data processing system selection was Gerard F. Haubrich, director of finance for the city of Pleasantville, N.J.

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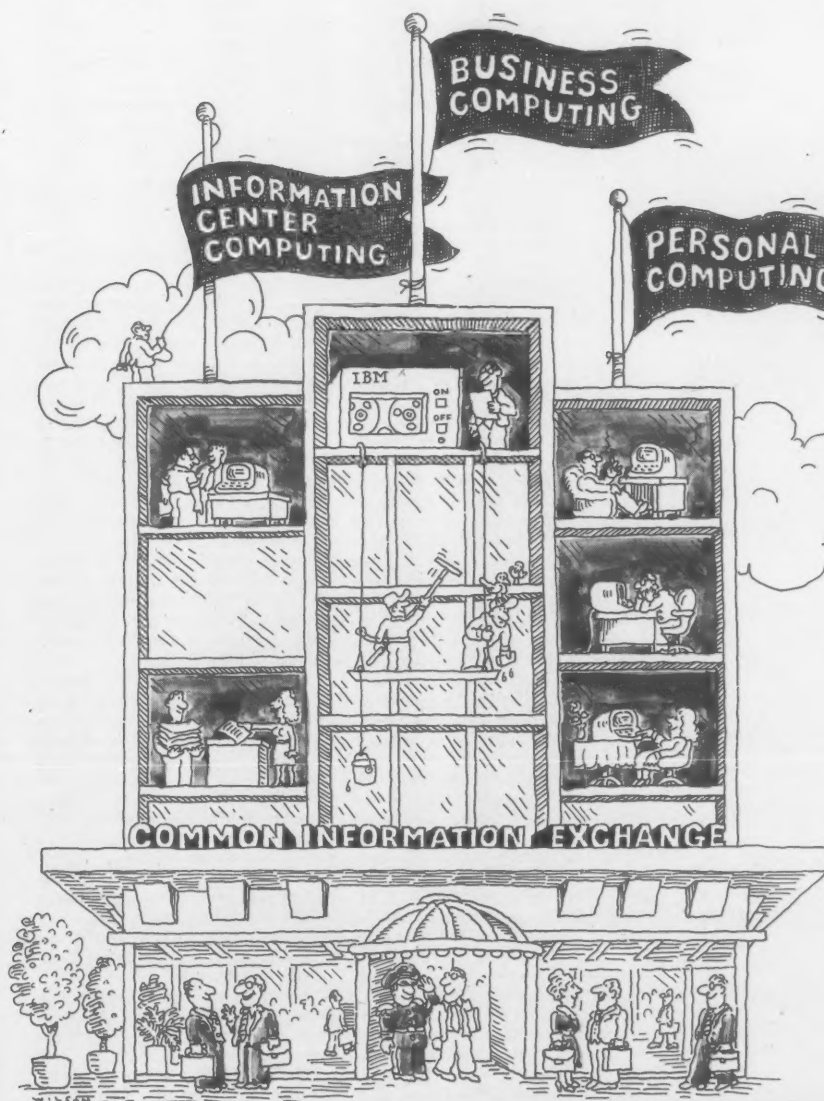
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Railway Makes Tracks With New Systems Concept Building on Existing System

TOPEKA, Kan. — To meet the competitive pressures and changes in operating procedures that have resulted from deregulation in the railroad industry over the past few years, the Santa Fe Railway has implemented a new information systems concept — known as Plus — that builds upon the railway's extensive user-developed system.

"Plus" is not an acronym, but springs from Santa Fe President and Chief Executive Officer Larry Cena's challenge to the Information Systems Department to develop a DP system that combines the best features of other railroads' systems as well as the capabilities needed to remain competitive through the 1990s.

Plus is a linking and an integration of several existing DP systems — the Mechanical Equipment Control System (Mecs), Operations Xpeditior (OX) and Division Operations Center (DOC) — into a massive central data bank that can be readily accessed by all railroad departments, according to its developers.

The OX system is the key component of Plus at the local level. Consultant James Martin has studied OX in detail and said, "If you want an example of how data processing must be done in 1990, take a look at the Santa Fe OX project."

car accounting."

The Plus+Bill system, which went on-line last summer, was the first step in providing this integrated data base. The goal of the Plus+Bill system is to produce a consistent, accurate waybill the first time data is entered into the OX system. Unless the raw waybill data is totally accurate, it will be impossible for the central Plus computers to relate it accurately to other areas, such as train movement and accounting.

"For many years, we have had difficulties with the spelling of customer names and locations on waybills," said Steve Anderson, assistant to the director of Plus. "With Plus+Bill, we have set up a master list of all customers and all locations. When a customer name and location is entered, it will be checked against that master list and rejected if it is not correct."

Also, with the Plus+Bill system, the computer will verify that the freight car number, date and hour of entry are correct, among many other checks. "With this system, it will be impossible to leave any blanks or make any mistakes with a waybill," Anderson said. "The Plus+Bill system just will not accept faulty waybill information."

Essential to Accounting System

The Plus+Bill system is essential to the Plus Revenue Accounting System, which is due to be on-line in 1984. With that system, as soon as a waybill is entered, it will be transferred to a file containing a one-year history of all similar moves. The system will check the revenue generated from the past moves and give an estimate for the revenue from the current move. This will eventually make possible daily revenue and profit reports, a capability that no other railroad has.

Another major component of Plus, due to be on-line this winter, will be Plus Train Movement, designed to aid trainmasters and yardmasters in much the same way the DOC system will assist dispatchers.

When fully implemented, virtually every Santa Fe department is expected to benefit from Plus. The operating department will be able to take advantage of modernized train movement and car distribution systems. Plus will give the accounting department virtually automatic handling of contract shipments and will permit the department to redesign completely the revenue accounting system. The mechanical department will find its capabilities expanded by integrating its Mec system with the Plus Train Movement. For traffic and executive department personnel, Plus will mean instant access to a huge pool of information on operations, including daily cost and revenue estimates.

"But the biggest winners will be our shippers," Paul said. "We will be able to offer them greater reliability in train movement, smoother handling of contracts and accounts, improved car location data and better expediting of time-sensitive loads."

Essential to Operation

Developed in the mid-1970s by a small team of operating department personnel, OX utilizes the Sperry Corp. Mapper software and is basically used by the operating department personnel to generate real-time information relating to freight yards and intermodal terminals. The OX system — which creates waybills, stores van records and records the arrival and departure of trains — is essential to the operation of the railroad. "Without OX," said W. L. Paul, vice-president of information systems, "Santa Fe would be buried in paper."

Mecs is the mechanical department's computerized system for keeping track of car and locomotive maintenance. Used at all maintenance points, Mec provides a complete history of all repairs to cars and locomotives, down to individual components. This information allows the mechanical department to make better decisions regarding choice of equipment vendors and scheduling of maintenance routines.

The DOC concept is being tested at Winslow, Ariz., and Clovis, N.M. When it is fully implemented, it will provide computer-assisted dispatching of trains across the system as well as computer-assisted calling of train and yard crews.

"The OX, Mec and DOC computers generate tremendous amounts of raw, real-time data regarding the operation of the railroad," Paul said. "All of this data, in the future, will be fed into the Plus central computers here, which will transform it into historical data bases for use by other Santa Fe data processing systems, such as those covering revenue and

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Survey Shows Small N.Y. Firms Increasing Computerization Level

By David Myers

CW New York Bureau
NEW YORK — One quarter of the New York metropolitan area's small businesses now use a computer in financial management, and 84% of them say they have benefited from that usage, according to a survey released here by Chemical Bank.

William H. Wulfling, vice-president and director of small business for the bank, said the study of 1,047 firms in the city and its outlying counties shows that Big Apple small businesses have reached a higher level of computerization than previous studies had shown.

"What it [the survey] says is that small businesses are moving at a somewhat more accelerated pace toward computerization. After suffering through the recession and finding themselves still here, they have learned a vital lesson. The usefulness of computerization has come alive for them," Wulfling said.

Small businesses still lag three to five years behind larger \$50-million-and-up companies, Wulfling added.

According to the survey performed this summer by Research & Forecasts, Inc., 40% of businesses in the metropolitan area with sales between \$500,000 and \$5 million expect to add a computer in the near future, while 34% of the business owners surveyed said they expect to buy a machine for use at home. Another 15% of those responding said they hope to have a computer both at work and at home.

Of those whose computers are already installed, 25% said they use the machines

for financial management, 17% said they use the computers in manufacturing and 9% said they are used in staffing.

Wulfling said that as a result of the study Chemical Bank has been reassured it needs to keep offering equipment financing to New York's small businesses.

But the bank's vice-presi-

dent said Chemical would never get into the business of recommending computers to prospective buyers.

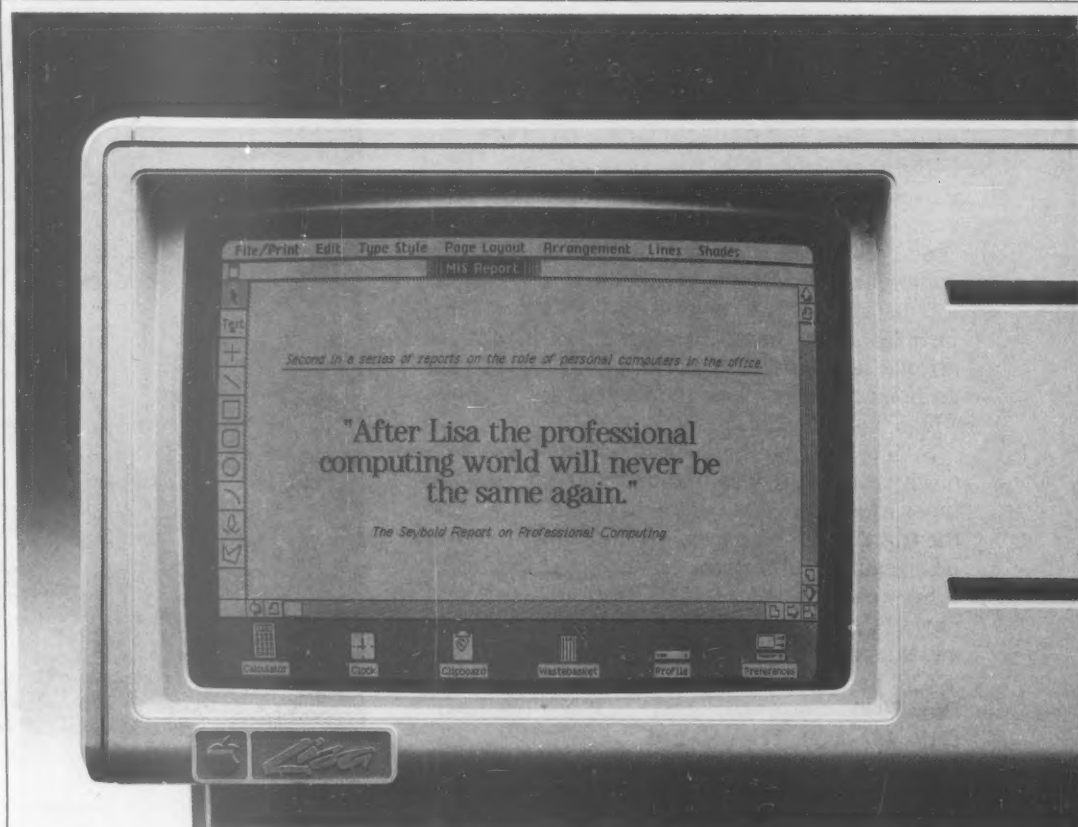
"We don't want to present ourselves as systems specialists. We won't recommend accountants and we won't recommend computers. We want them [business owners] to make their own independent decision," Wulfling said.

Seminar on Voice-Data Link Slated for Nov. 17-18

BETHESDA, Md. — A seminar on "Voice-Data Integration and the Digital Private Branch Exchange," sponsored by Phillips Publishing, Inc. and ICA Telemanagement, Inc., will be held Nov. 17-18 at the Vista Hotel in Washington, D.C.

The seminar's special feature will be a half-day session focusing on the new generation of integrated voice-data executive workstations. Participants will be given the opportunity to compare the features and functionalities of the new equipment.

The registration fee is \$495 from Phillips Publishing, Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.



Foy to Hold Chair At Marist College

POUGHKEEPSIE, N.Y. — The man who gave his name to Marist College's endowed chair in computer science will be the first professor to hold the chair, the college has announced.

Richard L. Foy, former president of the four-year liberal arts school here, is holding the Foy Chair in computer science for the 1983-1984 academic year. Foy, a Ph.D. in applied mathematics and computing from New York University, is now vice-president for finance and administration at Boyden Associates in New York.

The chair, endowed for \$600,000, was set up to attract computer experts to teach the college's 300 computer science majors and master's-level students to do their own research.

Apple's new Lisa[®] is the world's most powerful personal computer.

Its 32-bit MC68000 microprocessor gives it the processing capability of a mid-range mainframe.

It also has one million bytes of internal memory. And, with a 5-Megabyte hard disk, more than 15 times the on-line mass storage of standard microcomputers.

Given these most imposing credentials, one could get the impression Lisa was designed solely to scare one's socks off.

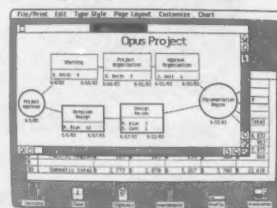
On the contrary.

What makes Lisa totally revolutionary is that, for the first time, all this phenomenal power is contained in a business computer you can learn to use in under 30 minutes.

200 years of hard work made it easy.

To tell Lisa what to do, all you have to do is point.

But achieving this simple concept required a totally new



Lisa's revolutionary software lets users perform several applications simultaneously, even "cut" and "paste" them together. The powerful project management program seen here is a Lisa exclusive.

approach to software and 200 person-years of development.

Lisa replaces complex computer commands with symbols

familiar to anyone who's ever worked at a desk.

Even someone who's never touched a computer before can learn Lisa in under half an hour. Versus the 20 hours or more required to unriddle conventional PCs.

To information managers, that means dramatically reduced training time and increased productivity.

But people don't just learn faster on Lisa, they also work faster. Each of Lisa's powerful applications* use symbols and commands common to all. So with little practice, users can move from LisaCalc to LisaGraph to LisaWrite without missing a beat. Or use them all at once, "cutting" information from one program and "pasting" it directly into another.

DBMS Quickens Response Time for County

SACRAMENTO, Calif. — Only a few years ago, computer services in the county government here were causing more problems than they were solving.

Cumbersome batch-oriented centralized systems were leading more and more county departments to acquire their own minicomputers. The results were predictable. Data was scattered in duplicate files on incompati-

ble systems; revisions on one system were not passed on to others; and even the stand-alone applications only rarely measured up to expectations.

But software packages have changed all that. County officials credit packages from Software AG of North America, Inc., including its Adabas data base management system (DBMS), with giving them access to up-to-

date central records and enabling them to develop new systems and services.

Steve Crane, a senior analyst programmer, noted that the county is using the Software AG products "for almost all our on-line activities in the voter election areas — for example, everything from working with files of our 450,000 registered voters to maintaining street files and precinct district files."

Before the installation of the DBMS, county government computer users were happy to go from a batch to an interactive environment, but were unhappy about the system's response time, according to county systems analyst Stan Rose.

"We were using Isam files, and with a quarter of a million records or more, response time for our on-line systems deteriorated rapid-

ly." A DBMS was the obvious solution.

"We opted for Adabas for [two] reasons. One, [its] flexibility allowed for the easy design of logical record structures. Two, the controlled access to the data and the ad hoc ability of a query language [met our] particular needs."

Rose also praised the system's choice of access methods.

"We began our on-line programs in Cobol, and in the criminal justice area especially we wanted to keep it that way," Rose said. The Software AG package permitted the county to do this by writing call statements, he pointed out.

Warrant Program

One example of the improved services made possible by the county's use of Software AG products is the warrant-of-arrest program installed 2½ years ago in the sheriff's and county marshal's offices.

Prior to installation, warrants had been inventoried in several places in both offices as well as in the police departments of several cities within the county.

All too often suspects were arrested more than once on a single warrant, resulting in a raft of lawsuits against the county.

With the new system in place, the warrants are located centrally, with remote terminals installed for direct query access. "Since we got the system up, the county has never arrested a person twice on the same warrant," Rose boasted.

The existence of a common pool of systems and data is permitting Sacramento County to provide computer services that were previously not cost-effective. "In one case, the probation department needed a certain system, but didn't have money in the budget to do it. Yet given the data we already had elsewhere in the criminal justice area, we determined that we could meet a real need just by adding two more dates and some indicators," Rose recalled.

As a result, the county has created one big user group on government payrolls. "Once we centralized the DP functions, we essentially created a giant user group out of all the various agencies, which meets every month. Slowly, the users started talking with one another, crossing boundaries they previously wouldn't. Sharing data, getting the benefits of other departments' updates, is bringing them together in a whole new way," Rose noted.

Powerful connections.

Any Lisa system can become part of a powerful Lisa network through AppleNet, our own low-cost local area network.

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Using the LisaTerminal program, Lisas can tie into mini, mainframe and other personal computers by emulating VT 100-type terminals. Or, using the Apple Cluster Controller, it can also emulate 3270-type terminals.

In short, one Lisa can do the chores of many terminals. All of which means swifter response times and better distribution of resources.

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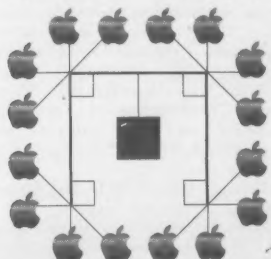
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*With more programs on the way, Lisa's library now includes LisaCalc electronic spreadsheet, LisaList data base, LisaWrite word processing, LisaGraph business graphics, LisaDraw presentation graphics, LisaProject electronic project management and LisaTerminal data communications. For information regarding corporate purchases through our National Account Program, call (800) 538-9696. In Canada, call (800) 268-7796 or (800) 268-7637. Or write to Apple Computer Inc., MIS/EDP Marketing Dept., 20525 Mariani Ave., Cupertino, CA 95014. ©1983 Apple Computer Inc.

There's even a program — LisaProject — that lets you use the mouse to chart the progress of complex projects, automatically recalculating when deadlines or resources change.

On paper, Lisa is just as exceptional. With its dot matrix and daisy wheel printers, it produces printed materials just as you see them on the screen.



AppleNet, available soon, will let Lisas and other Apples share information, and costly peripherals.

Conference to Target Micro/Mini Financial Applications

CHICAGO — The Micro/Mini Financial Applications Conference will be held Dec. 5-6 at the Hyatt Regency O'Hare here by the Financial Managers Society, Inc. (FMS) and the Association of Information Managers (AIM).

General session speaker Robert Lang, editor of *Microbanker*, will present an overview of the microprocessor industry. Financial and accounting software, microprocessors, departmental data networks and financial industry automation are some of the topics that will be discussed by 21 speakers during the two-day conference.

The conference reportedly will

feature more than 16 exhibits displaying micro and mini applications that facilitate asset and liability management, budgeting, investments, spreadsheets, financial reporting, projections, portfolio analysis and pro forma modeling. In addition, hands-on demonstrations of micro and minicomputers will be offered.

Registration fees are \$250 for FMS and AIM members and managing officers and \$350 for non-members.

More information on the conference is available from FMS, 111 E. Wacker Drive, Chicago, Ill. 60601.

Data Training Conference Scheduled for San Francisco

SAN FRANCISCO — The fourth annual Data Training Conference and Exposition — Data Training '83 — will be held here at the San Francisco Hilton and Tower Dec. 11-15.

The conference is sponsored by *Data Training*, a monthly newspaper for information trainers, and will feature three keynote speakers. Richard N. Bolles, author of the best-selling career change and job-hunting book, *What Color Is Your Parachute?*, will speak on the topic of "Data Training and the Whole Person." Jan Margolis, director of personnel development at Bristol-Myers Co., will discuss corporate strategies for change, and Edward Yourdon, chair-

man of the educational software and consulting firm, Yourdon, Inc., will offer observations on "megatrends" within the data processing field.

The conference will also feature eight full-day workshops on topics such as "Developing a Computer-based Training Strategy," "How to Author Better Computer-based Training Programs," "Technical Training," "How to Write Good User Documentation," "Managing the DP/User Interface," "Job Control Language for Data Processing Professionals" and "Instructor Skills."

In addition, 60 sessions will be held to cover data processing training from a variety of angles. Among the session topics will be "DP Training Management," "User Training," "Computer-based Training," "Training for Technical People," "Microcomputer Training," "Office Automation Training" and "The Information Center."

According to the sponsor, more than 85 companies will exhibit computer and data processing training products and services, including training programs, books, multimedia equipment and hardware and software services.

Admission is \$475 for the full conference. Further information is available from Conference Manager, Data Training '83, 176 Federal St., Boston, Mass. 02110.

Data Interchange Set for December

WASHINGTON, D.C. — Sponsored by the Transportation Data Coordinating Committee, the 15th National Data Systems Forum and Exhibit, dubbed "The World of Electronic Data Interchange Part II," will be held here Dec. 13-14 at the Washington Hilton.

According to the sponsor, the forum will address the technology of computer and communications industries that facilitates the electronic interchange of data for intercompany transactions.

Keynote addresses will be offered by John F. Magee, president and chief executive officer of Arthur D. Little, Inc., and J. M. Hewitt, general manager of the IBM Information Network.

Magee will speak on "Transacting Business Electronically," and Hewitt will address "The Role of the Information Networks."

Forum workshops will cover a range of topics including "Warehouse Information Network Standards," "Data Interchange in Banking and Finance," "Network Services," "Communications Support for Data Interchange," "Electronic Transmission of Text and Graphics" and "EDI Software for Data Interchange," according to the sponsor.

The registration fee for the forum is \$250.

More information is available from the Transportation Data Coordinating Committee, Suite 606, 1101 17th Street N.W., Washington, D.C. 20036.

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Engineers make system start-up fast and easy. The CC-3276 also comes with a separately addressable printer port as standard equipment, and can be teamed with almost any asynchronous printer for use as a 3287.

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Modeling Program Predicts Flow of Black Gold

GOLDEN, Colo. — A company here has taken modern technology to the oil fields to help keep that black gold flowing.

A division of Smith International Inc., Smith Energy Services specializes in improving oil and gas-well production through a technique known as hydraulic fracturing. With the aid of a computerized modeling system operating on a Digital Equipment Corp. VAX-11/780 supermini-computer, Smith Energy's engineers are now able to determine quickly the exact steps necessary to improve output at wells owned by a variety of clients, including Shell Oil, Amoco and Exxon.

Hydraulic fracturing involves forcing a thick, jelly-like fluid into existing well bores at extremely high pressure to create hundreds of new fractures in the surrounding rock structure. After sand is forced into the fractures for support, the fluids are removed, and oil or gas seeps through the sand adding new output to the existing wells of client companies.

Manual Expenses

In the past, Smith Energy's engineers relied on time-consuming manual calculations to predict the cost and the expected additional output that would result from the fracturing process.

Now, engineers can draft a proposal for prospective clients in only a few hours with a modeling program developed on the DEC system. The performance results are evident in both improved prediction capabilities and an increase in sales.

"We have found that there is a definite correlation between the number of proposals we write and the amount of business we do," said Ray Wood, manager of information services. "This is a very competitive business and getting the extra number of proposals out has helped us considerably."

At the heart of Smith Energy's computerized modeling system is the VAX-11/780 with 4M bytes of main memory, three RP07 disk drives with 512M bytes of storage each, two TU78 tape drives, one 1,000 line/min printer, 64 VT125 terminals, 10 color plotters and 10 remote printers.

The system runs under the VAX/VMS operating system.

Technicians program in Fortran, Cobol and Basic utilizing Berkeley, Calif.-based Relational Technology, Inc.'s Interactive Graphics and Retrieval System (Ingres), a relational

data base package, with support utilities and the Precision Visual Graphics Program (PVI3000) from Precision Visual Graphics of Boulder, Colo.

The company also purchased accounts payable and general ledger application programs from Software International of Andover, Mass.

In choosing the VAX, financial risk was a major consideration for Smith Energy. "Looking at our potential growth, we needed something that would allow us to expand our processing capability without overextending ourselves financially," Wood said. "We did not want to buy excess processing capacity. We knew that with this system we could

(Continued on Page 40)



Smith Energy technician receives proposal at a remote district office a few moments after completion by headquarters engineers.



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Modeling System Predicts Flow of Black Gold

(Continued from Page 39)
install a second VAX-11/780 if and when it was needed."

That consideration proved to be critical. The company had expected to double in size by 1986, but due to the oil industry slowdown, Smith Energy's growth has not been as rapid.

When evaluating computer systems, Smith Energy narrowed the field to the IBM 4341, the VAX-11/780 and a combination of the Hewlett-Packard Co. 3000 Series 44.

The combination package was passed over because of slow intercomputer communications and because applications in one system could not access the data base in the other.

According to Wood, the VAX was chosen because it provided "about 1½ the performance at about one half the cost of the IBM 4341 proposed configuration." In addition, Wood said, the VAX offered superior scientific and engineering software, with more than adequate business and financial software.

In addition to well modeling, the system supports interactive management infor-

mation reporting, inventory control for more than 10,000 items at six locations, on-line financial record keeping and electronic mail and video functions.

To accommodate communications between the company's headquarters here and its six district offices in four states, where inventory and equipment for the hydraulic fracturing process are located, Smith Energy uses the Digital Communications Associates, Inc. DCA3500 front-end processor with four Dataphone II multiplex trunks, which operate at 4,800 bit/sec over a leased

data network.

Each district office has two on-line VT125 terminals from DEC, an eight-color plotter and a low-speed printer.

According to Wood, the first phase of proposal drafting for a prospective client involves modeling a well to determine the material, equipment and procedures to be employed. Sales engineers enter physical data about the well, such as location, casing size, depth and formation characteristics. The computer predicts the proper fluid for use in the fracturing process, the

pumping pressure required and the theoretical outcome of the well-stimulation procedure.

Engineers can alter the models on-line in order to make "what if" analyses and, when the optimum well-stimulation process has been determined, the recommendation is printed along with eight-color graphics charts of the data.

The predictions must be accurate, Wood said, because the wrong procedure could totally disrupt a drilling project costing \$5 million or more.

"In the second phase of proposal drafting, we take all this information and draw up a bid for the fracturing project. The bid outlines what a customer can expect in terms of additional out-

put, in barrels, for the well. We have been able to combine the modeling function with very high-quality graphics to make a complete presentation package. It's also very accurate. Our customers have been quite pleased with the results," Wood said.

With the system, which was installed in April 1982, one engineer in a district office can prepare several recommendations in one day, or he can transmit the data back to the company's headquarters where a colleague can draft a proposal and send it back to the district office. If the company has modeled a nearby well, the engineer can draw on data already in the data base, adding only specific information about the new well.

Seminar to Address Ways of Reducing Backlog

WOODLAND HILLS, Calif. — Management consultant Atwater, Lantz, Hunter and Co. is sponsoring a seminar on "Reducing the Backlog" as part of its Systems Methodology Round Table series.

The session will be held Dec. 5-6 at the Marriott Biltmore Hotel in Santa Barbara, Calif.

The focus of the two-day

meet will be on the most serious problems facing management information systems (MIS) in the opinion of senior management.

The aim of the round table is to have attendees help one another develop strategies for reducing backlog, according to the consulting firm.

The facilitators of the seminar will be D. Christopher Noonan of Coopers & Lybrand and Kenneth Lantz of Atwater, Lantz, Hunter.

Discussion will include reviewing how much backlog has built up; examining possible remedies such as productivity aids, information centers, the use of microcomputers and prototyping; and helping each participant outline a plan for tackling his backlog.

Attendance is limited to 30 people, each of whom must be either a vice-president or director of MIS or hold the title of systems development manager.

Registration costs \$625, which includes meals, but does not include hotel accommodations, a spokesman said.

More information is available from Atwater, Lantz, Hunter at Suite E, 22458 Ventura Blvd., Woodland Hills, Calif. 91364.



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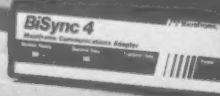
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Builder Moves to New Accounts Payable System

McCOMB, Miss. — Clearly, Croft Metals, Inc. was asking more of its accounts payable software package than it could handle.

"Our accounts payable system was an added-to, mixed-in, quick-and-dirty system that we developed ourselves. It didn't have the capability to match purchase orders, invoices and receiving documents with one another, and that was something we really wanted," Accounting Manager Joseph Abbott said of the software that ran on an IBM 4341 mainframe. "Aside from offering access to vendor and invoice numbers, the system gave little breakdown of details."

The old system had been used by Croft Metals, a national manufacturer of aluminum home-building products, to store voucher information and produce payment checks. But because of its minimal reporting and storage capabilities, it had to be replaced with a package that could meet the company's expanding needs — one that could match purchase orders, invoices and receiving documents, provide access to stored information and perform standard maintenance of all accounts payable records.

The company chose University Computing Co.'s (UCC) Accounts Payable System (APS) with purchase order control because, Abbott said, "aside from meeting all our requirements better than packages from other vendors, [UCC's APS] was the first of those we reviewed to offer an on-line system. We could see that an on-line system would be easier to operate and would offer access to more information."

Batch System Procedure

In the past, the batch system procedure for processing the company's accounts payable began with clerks who manually produced the transactions on paper forms twice each week. The data was then batched and keypunched, and if errors were found, corrections were made and keypunching was repeated. Finally, checks were processed.

Now, those clerks process the almost 2,000 payable invoices each month using the APS system, which was installed in June 1982. After invoice and order information is entered on-line, the system checks for duplication, performs the three-way match and sends errors to a suspense file for correction. Before any checks are written, a trial payment report is produced for Abbott's approval.

"A daily listing of checks to be mailed out was available with the old system," Abbott said, "but it was produced only after the checks had been processed. With the old system, I had the ability to hold a check back from payment, but I could not have a check produced if a transaction had inadvertently been overlooked. Now, I have that capability."

Abbott said the on-line capability of the system has lightened the clerical work load in the payables department. Because accounting clerks who used to write transactions manually now key in information on-line, two keypunch operators have been freed for other duties.

"APS requires that clerks balance each transaction before continuing

to the next. This has eliminated at least 75% of all errors made on-line," Abbott said.

The APS package offers an extensive set of standard reports, with a number of variations. For example, the system allows Abbott to sequence the daily invoice register of all invoices entered or paid in three ways: daily totals in gross and net amounts, totals by accounting period and totals for a pay period. With this information, Abbott can determine whether the gross number of transactions agrees with the information from the general ledger and whether the paid amount matches the results from these reports.

Among the other standard reports are a repeat payments report, a trial

balance report of all account payables outstanding at the end of the month, a cash requirement report to project the number of vouchers to be paid during the month, an account distribution report and an employee expense report. An APS report writer feature allows users to control report content, format, sequences, totals and logic.

Despite some initial apprehension, Abbott said his accounting staff is growing accustomed to the automation of their functions. "Once they realized that these systems prevent them from making major mistakes, they had no problems adapting. Once the staff got over the initial nervousness, they realized it could do a lot for them."

With the help of UCC consultants, Croft Metals recently enhanced APS to utilize better the system's three-way matching feature. "APS accepts purchase order information for later comparison to invoice and receiving data," Abbott explained. "But, Croft Metals works on a standard cost system, and the accounting department must handle variances. The enhancement we created takes entries off the invoice and nets them together to see if they conform to the purchase order. A standard charge may be 75 cents, for example, but the voucher will show entries for the 65 cents we pay and the 10 cents we discount. The system can now accept these figures to verify the addition on the entered invoices."

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Calendar

Week of Nov. 6

Nov. 8, Newton Lower Falls, Mass. — **Computer Security vs. Computer Crime — A Practical Approach.** Contact: Dan Leonard, EDP Auditors Association, Inc., P.O. Box 516, Boston, Mass. 02102.

Nov. 8-10, New York — **The 10th Annual Computer Security Conference.** Contact: Computer Security Institute, 43 Boston Post Road, Northborough, Mass. 01532.

Nov. 8-11, Cary, N.C. — **Introduction to Data Processing Using SAS (OS) Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Nov. 8-11, San Francisco — **Data Communications: Components, Systems and Networks.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Nov. 8-11, New York — **CICS/VS System Design.** Contact: Kaaren Perez, Comped, 10 E. 21st St., New York, N.Y. 10010. Also being held Nov. 14-17 in Dallas.

Nov. 9-10, Hartford, Conn. — **Focus Data Base Design.** Contact: Data Base Management, Inc., 1075 Tol-

land Tnpk., Manchester, Conn. 06040.

Nov. 9-10, Washington, D.C. — **Understanding Modern PBX Systems.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Nov. 9-10, New York — **World Update '84.** Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

Nov. 9-10, New York — **Crisis 1984: PBX vs. Centrex.** Contact: The Eastern Management Group, 520 Speedwell Ave., Morris Plains, N.J. 07950.

Nov. 9-10, New York — **Advanced Vsam.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Nov. 9-11, San Francisco — **Data Communication: Effective Network Design.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 9-11, Washington, D.C. — **Cryptography and Data Security.** Contact: Hellman Associates, Inc., 299 California Ave., Palo Alto, Calif. 94306.

Nov. 9-11, New York — **Telecommunications Man-**

agement: Cost Reduction Techniques. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 9-11, St. Louis — **Industrial Robots Course.** Contact: The Program Coordinator, The Center for Productivity Technologies, Suite 200, 28551 Southfield Road, Southfield, Mich. 48076.

Nov. 9-11, San Francisco — **Microcomputers: A Guide to Selection and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 9-11, Parsippany, N.J. — **MVS Dump Debugging.** Contact: Chubb Institute, 8 Sylvan Way, Parsippany, N.J. 07054.

Nov. 9-11, New York — **Data Communications for Microcomputers: A Guide to Selection and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 9-11, San Francisco — **Computer Operations Management: Effective Techniques.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 9-11, New York — **Introduction to Telecommunications.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Nov. 9-11, New York — **Computer Performance Measurements and Capacity Planning: Tools and Techniques.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 10, Philadelphia — **Building Blocks for Office Automation.** Contact: Career Designs, P.O. Box 535, Sicklerville, N.J. 08081.

Nov. 10-11, Chicago — **Personal Computers: A Hands-On Experience.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 10-11, Boston — **Software Engineering.** Contact: Battelle Seminars and Studies Program, 4000 N.E. 41st St., P.O. Box C-5395, Seattle, Wash. 98105. Also being held Nov. 17-18 in Seattle.

Nov. 10-11, Boston — **Data Base Strategies.** Contact: Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904. Also being held Nov. 14-15 in Philadelphia.

Nov. 10-12, Boston — **The Fifth Annual Northeast Computer Show and Software Exposition.** Contact: Northeast Expositions, 822 Boylston St., Chestnut Hill, Mass. 02167.

Nov. 10-13, Los Angeles — **The Third Annual Los**

Angeles Computer Showcase Expo. Contact: The Interface Group, 300 First Ave., Needham, Mass. 02194.

Nov. 11-17, St. Thomas, Virgin Islands — **The Information Systems Consultants (ISC) First Annual International Micro, Mainframe, Office Automation Conference and Exhibit.** Contact: ISC, C.L. Grasser, Conference Consultant, Suite 908, 1390 Market St., San Francisco, Calif. 94102.

Nov. 12-14, Lake Buena Vista, Fla. — **Society of Telecommunications Consultants, Inc. 1983 Fall Conference.** Contact: Society of Telecommunications Consultants, Suite 1410, One Rockefeller Plaza, New York, N.Y. 10020.

Nov. 12-19, New York — **Vsam: Performance Design and Fine Tuning.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Nov. 12-19, New York — **CICS Debugging.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Week of Nov. 13

Nov. 14, San Francisco — **IBM CICS/VS Concepts and Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 14, Toronto — **Unix Training.** Contact: Human Computing Resources Corp., 10 Saint Mary St., Toronto, Canada M4Y 1P9.

Nov. 14, Chicago — **IBM System/36 and System/38 Seminars.** Contact: DGC, Inc., 1450 Preston Forest Sq., Dallas, Texas 75230. Also being held Nov. 21 in New York and Nov. 28 in Atlanta.

Nov. 14-15, Boston — **Personal Computers in the Corporate Data Base.** Contact: The American Institute for Professional Education, Car-

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negie Building, 100 Kings Road, Madison, N.J. 07940. Also being held Nov. 28-29 in San Francisco.

Nov. 14-15, Chicago — **1984 Impact of Divestiture on Users and Vendors.** Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

Nov. 14-15, Atlanta — **Optimizing Long-Distance Services.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Nov. 14-15, Washington, D.C. — **Local-Area Networks: Selection Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 14-15, Philadelphia — **Changing Data Base Strategies.** Contact: Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

Nov. 14-15, Boston — **Software: A Legal Briefing for DP Professionals.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held Nov. 17-18 in San Francisco.

Nov. 14-15, New York — **Voice Mail and Messaging Systems: How to Select, Implement and Manage.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Nov. 14-15, New York — **Introduction to Unix.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Nov. 14-16, Atlanta — **Data Communications: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 14-16, Washington, D.C. — **Managing Proliferation of Small Computers.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 14-16, Chicago — **Distributed Systems Designs: Micros to Mainframes.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 14-16, New York — **A Telecommunications Survival Spreadsheet.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Nov. 14-16, San Francisco — **Microcomputers: Tools of Today and Tomorrow.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 14-16, San Francisco — **Successful Use of Mini-**

computers. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 14-16, Parsippany, N.J. — **Vsam in Cobol.** Contact: Chubb Institute, 8 Sylvan Way, Parsippany, N.J. 07054.

Nov. 14-16, Washington, D.C. — **Systems Analysis and Design.** Contact: The Institute for Professional Education, Suite 303, 1515 N.

Court House Road, Arlington, Va. 22201.

Nov. 14-16, Dallas — **Systems Analysis and Design: Concepts and Effective Practice.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 14-16, College Park, Md. — **Computer Workload Characterization and Performance Evaluation.** Contact: Conferences and Insti-

tutes Program, University of Maryland University College, University Blvd. at Adelphi Road, College Park, Md. 20742.

Nov. 14-16, Washington, D.C. — **Data Dictionaries: Concepts, Contents and Uses.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Nov. 14-16, Phoenix — **Data Communication Systems.** Contact: The Institute

for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 14-16, Indianapolis — **Systems Project Management.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

Nov. 14-16, New York — **Data Administration: Successful Techniques.** Contact: (Continued on Page 44)

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(Continued from Page 43)

Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 14-16, Atlanta — **IMS/VS Message Format Services.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Nov. 14-16, Los Angeles — **Computer Awareness: Basic Concepts, Compatibility and Terminology.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 14-16, Washington, D.C. — **Project Management, a Practical Workshop.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 14-16, Parsippany, N.J. — **Job Control Language.** Contact: Chubb Institute, 8 Sylvan Way, Parsippany, N.J. 07054.

Nov. 14-16, San Francisco — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Nov. 14-16, Washington, D.C. — **DP Project Management: A Practical Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 14-16, New York — **Managing Information Services.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Nov. 14-16, New York — **CICS/VS Command Level Debugging.** Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

Nov. 14-17, San Francisco — **Data Base: Administration and Control Workshop.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Nov. 14-17, Detroit — **Factory Electronics Conference and Exhibition.** Contact: Intertec Communications, Inc., 2909 Ocean Drive, Oxnard, Calif. 93030.

Nov. 14-17, Boston — **Developing Integrated Purchasing/Accounts Payable Systems.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Nov. 14-17, Dallas — **Structured Analysis Workshop.** Contact: Kaaren Perez, Compd, 10 E. 21st St., New York, N.Y. 10010. Also being held Nov. 28-Dec. 1 in Boston.

Nov. 14-17, Boston — **Software Engineering with Ada.** Contact: The U.S. Professional Development Institute, Software Engineering with Ada, Department ABC-DEF, 1805 Powder Mill Road, Silver Spring, Md. 20903.

Nov. 14-17, San Francisco

— **The International Information Management Congress (IMC) Conference and Exposition.** Contact: IMC '83, P.O. Box 34404, Bethesda, Md. 20817.

Nov. 14-18, Oakbrook, Ill. — **Software Development Performance Engineering.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Nov. 14-18, New York —

Hands-On Unix System Workshop. Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Nov. 14-18, Boston — **Advanced Structured Analysis.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Nov. 14-18, Vancouver, British Columbia — **Advanced Systems Analysis.** Contact: Association for Sys-

tems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

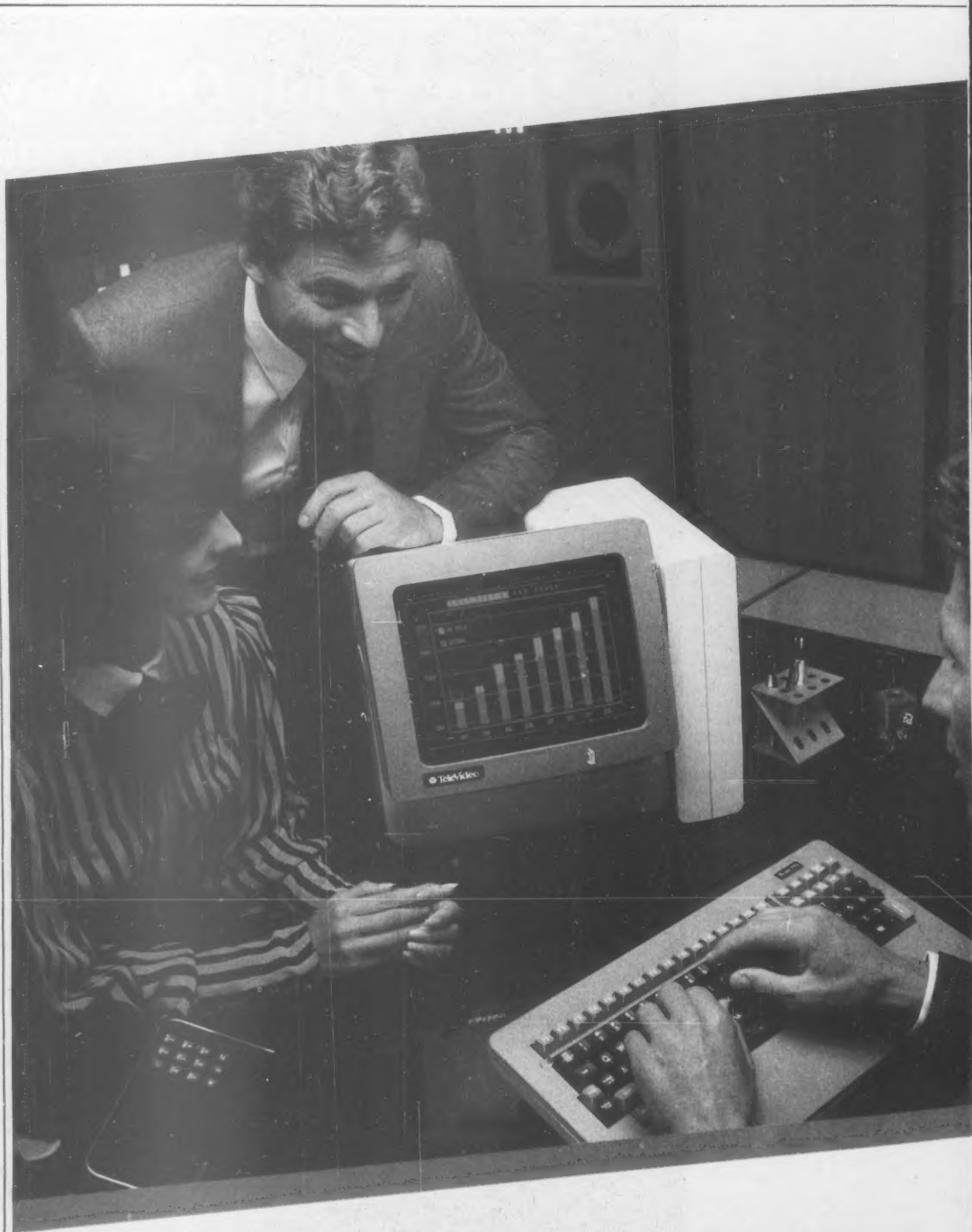
Nov. 14-18, Chicago — **Advanced Structured Analysis.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Nov. 14-18, Houston — **Structured Data Base Design Workshop for 1983.** Contact: Learmonth and Burchett Management Systems, Inc., Suite 320, Dresser Tower, 601

Jefferson, Houston, Texas 77002.

Nov. 14-18, Washington, D.C. — **Basic Systems Analysis.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

Nov. 14-18, Portland, Ore. — **Structured Analysis/Design Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.



Reagan to Address OA Meet Via Videotape

WASHINGTON, D.C. — A videotaped address by President Reagan emphasizing the importance of office automation in improving government efficiency will highlight the 1983 Federal Office Automation Conference, which is slated to be held at the new Convention Center here Nov. 1-3.

Prepared specifically for the conference, Reagan's

message will accompany an address by Craig L. Fuller, assistant to the president for Cabinet affairs. Fuller's address is expected to expand on the conference theme of "Office Automation: Making It Work."

Both presentations will highlight the administration's use of office automation as a means of achieving its goal of making govern-

ment more businesslike.

According to Morris Edwards, program chairman of the Federal Office Automation Conference, the administration's first step in this area was the creation of the Grace Commission to aid the government in adopting business practices from the private sector.

In addition, the government has enacted "Reform

'88" to encourage standardization of management information systems throughout federal agencies.

This fall, the White House will link all Cabinet-level departments and nine major independent agencies through a full-scale electronic mail network — to be known as the "Executive Office Data Link" — which will be designed to expedite com-

munications between the Executive Office of the president and more than 200 top-level federal executives.

The conference's three-day program will feature sessions on planning, implementing and managing office automation as well as a number of technology briefings on equipment and trends in the field. The conference will also feature an office automation exposition, according to the sponsor.

The cost to attend the full conference is \$350. Information is available from the National Council for Education on Information Strategies through P.O. Box N, Wayland, Mass. 01778.

Conference On Robotics Set for Nov. 8

DETROIT — A two-day conference on "Robotics: The Human Factors" will be held Nov. 8-9 at the offices of the Engineering Society of Detroit (ESD). Sponsors include ESD, The Robot Institute of America (RIA) and the Business Attraction and Expansion Council of the Greater Detroit Chamber of Commerce.

The conference will examine the adjustments faced by humans when robots are installed in the work place. Specific topics will include trends affecting the introduction of robots, conditions that shape company policies on automation, ensuring safe robot installations and how a commitment to robotics affects a company's organizational structure.

Registration fees for members of RIA and other sponsoring organizations are \$110 for one day and \$170 for two days. For nonmembers fees are \$125 for one day and \$195 for two days.

Registration information is available from Robert C. Schultz, Educational Consultant, ESD, 100 Farnsworth, Detroit, Mich. 48202.

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EDITORIAL

The Bypass Question

A major premise of last December's Federal Communications Commission decision to levy a charge on business and residential telephone users for access to the long-distance network — and also a major premise of two communications bills now pending in Congress — is that bypass technology threatens universal telephone service. According to this argument, if telephone rates increase significantly, business users will migrate in droves to bypass services, forcing residential users to pay a bigger share of local telephone exchange costs.

To discourage the migration, the FCC and key policymakers in Congress want to impose surcharges on bypass circuits and services. But if the underlying premise is wrong, the surcharges would also be wrong.

In its report earlier this month on S. 1660, one of the two pending communications bills, the Senate Commerce Committee suggested that the danger of bypass may be more rhetorical than real. Because of the local exchange's ubiquity and relatively low cost, and because some bypass technology and most bypass suppliers do not have adequate track records, it is unclear whether business users will desert the local dial-up network en masse to escape increased rates, the committee said.

But in the course of reaching this conclusion, the committee ignored another one that seems even more important: Even if higher telephone rates cause most business users to seek alternative transmission services, why is it assumed that local telephone companies will lose this business?

Several Bell operating companies have requested FCC authorization to build and to operate digital termination systems, one popular form of bypass. Several telephone companies — Pacific Telephone Co., Southern Bell and Southern New England Telephone Co. — are greatly expanding their high bit-rate transmission facilities and services. Since most of these companies currently have greater resources and/or credibility than do vendors of bypass services, why do users have to pay a tax to increase the advantage of the former over the latter?

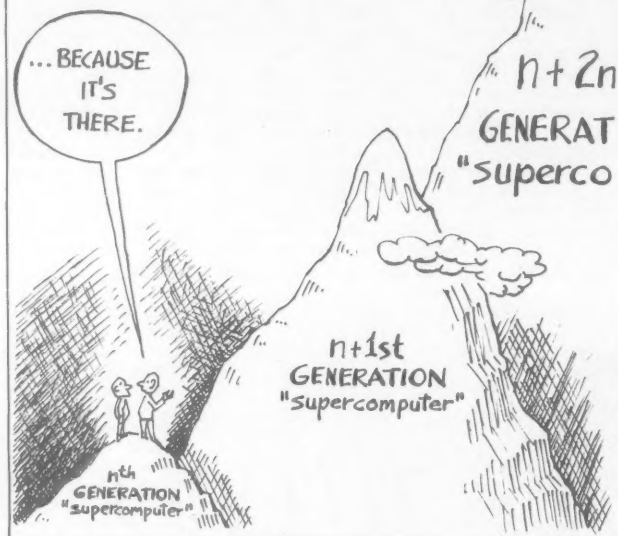
There's a lesson here for users as well as policymakers.

If the legislation now in Congress does not pass, large companies will benefit more than any other group of users. This is largely because AT&T's recently filed long-distance tariff grants whopping discounts to those users that lease wideband circuits connecting widely separated points.

The new tariff is based on the FCC's December access charge plan. AT&T said that if the plan is changed by Congress, then it will have to increase its rates. So it is understandable that the International Communications Association, which represents large corporate telecommunications users, is working hard to torpedo the legislation.

The ICA, however, could do more for its members by supporting the legislation in exchange for eliminating the bypass tax. For years, ICA members have been complaining about their inability to get satisfactory service from AT&T because of its dominant market position. They now have a chance to put their mouths where their money is.

Computerworld



LETTERS

Defending Privacy

The U.S. Bureau of the Census would like to make one very important point after reading the editorial "Silent Watchers" [CW, Sept. 12].

Under no circumstances can any government agency, official or private company obtain access to information about individual people or separate businesses from Census records.

The sale or release of respondent names or addresses is explicitly forbidden by law. Census employees are under severe penalties of fines and imprisonment if they break this confidentiality. And the bureau has an outstanding record of defending this privacy.

James E. Gorman
Chief

Public Information Office
U.S. Bureau of the Census
Washington, D.C.

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We have created the information age and changed the world. "We" includes anyone with more than a few years of experience grappling with any aspect of information.

We have two responsibilities as adult members of this society and active participants in the information technology revolution. First, we must continue to advance the technology, broaden its dissemination and reduce its cost.

Second, we absolutely must teach society, and particularly the young, our skills, our values and our emotional commitment to our work.

Like many in this industry, I've been fortunate to have had several mentors. Most young people today will have none.

To be successful, a mentor takes a personal interest in the achievement and development of his pupil. How many pupils do you have? How are

your pupils doing?

If we are to avoid disaster, we all must assume our ethical responsibility to exchange our values and our skills with others.

How is this to be done? Certainly with our collective talent we can solve this information problem. But do we have the commitment?

Richard Brown

Robert Half, Inc.
Washington, D.C.

Too Much Theory

The article "DP's Catch-22: A Lack of Qualified Teachers" [CW, Sept. 19] decries the lack of qualified teachers.

The article describes how universities are cutting back on the number of students allowed into computer science classes because of a lack of qualified Ph.D.s.

The real problem is that the universities have the mistaken idea that a Ph.D. is required to teach the subject. The fact of the matter is that too many of the students have too little practical training and too much theory.

Professional people with practical experience can solve the problem if the universities redefine what is required to be qualified.

Robert J. Bauhs
Manager

Management Information Systems
NL Sperry-Sun/NL Industries, Inc.
Sugar Land, Texas

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters may be edited for purposes of brevity and clarity. Letters should be addressed to Editor, Computerworld, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.

THE DATA CENTER/John P. Murray†

Addressing Education Needs of DP Staff

I was visiting a large organization in the Madison, Wis., area, and as I toured the data center, one of the operations supervisors stopped me and asked when I was going to do an article about the need to pay appropriate attention to the education needs of the data center staff. "When you publish something about the need for increased attention to education for data center personnel, I take it right into my boss: It gives me a chance to push for increased education for me and for my people," he said.

In order to put myself right with data center people, I will offer some comments on data center education needs.

The changes that are occurring as a result of the advances in information processing technology in the management information systems (MIS) client areas are dramatic. These changes are being given increased attention not only from writers concerned with information processing issues, but from any number of other areas.

As has been the case with much of the history of information processing, the impact of these changes on those who work in the data center are, to a great extent, being overlooked.

Changing Functions

The data center environment will undergo as much change as any other area as a result of the burgeoning growth and rapid change of information processing techniques. Some rather obvious, yet often overlooked, aspects of these changing functions can help to illustrate this point:

- Many of the manual aspects of the data center effort are disappearing.

'Everyone who has a job in an organization's data center should be taking a hard look not only at what is occurring in his installation (his MIS department may not be doing anything), but also at what is occurring in the information processing world at large.'

ing. Changing of disk packs is no longer necessary, or even possible, with fixed head disk drives. Punched cards are, to varying degrees, being phased out.

It will take a while, but the punched card will disappear. Centralized data entry functions, through the use of very straightforward software packages, are being distributed to the client areas. Increased use of on-line processing means, in time, less tape processing and, therefore, less of a need for tape mounting and tape library control functions.

- Batch processing, with its heavy requirement for tight data center control and intervention, is giving way to on-line, client-controlled processing. The information center is an excellent example of this change.

- The introduction of data base management systems often removes various aspects of control of the processing environment from the data center to the data base management function of the MIS department.

- It seems realistic to assume that much of the control of the processing environment now being managed by computer operators will, in the future, be placed under the control of operating software. This will probably not come about soon, but it is likely to happen. The remote opera-

tion feature of the IBM 4321 would appear to represent a step in this direction.

Serious Problem?

If all this is happening, does it indicate the existence of serious problems for those now working in the data center?

The answer is no, provided these people begin to give serious consideration to the occurrence of these changes and if they begin to prepare themselves in order to continue to make a strong contribution in the changed information processing environments that will evolve.

The most serious problem these people face is in becoming complacent and allowing the technology to pass them by. Data center employees are not alone in this regard; programming, as we know it today, is also an endangered species.

Everyone who has a job in an organization's data center should be taking a hard look not only at what is occurring in his installation (his MIS department may not be doing anything), but also at what is occurring in the information processing world at large.

Using the knowledge obtained from such an investigation, data center employees should then begin to give serious consideration to where

future opportunities are to be found. This will take some time and effort, however. Simply to ignore what is occurring will result in a dead-end job.

Some Considerations

Some of the considerations are:

- Will new opportunities open up within the data center staff?

- What new opportunities exist for people with data center skills and experience outside the data center — for example, in the MIS department or in other areas of the organization?

- Regardless of where they may become available, what skills will these jobs require?

- How can we go about the process of developing these required skills?

A serious discussion about the subject with your supervisor may help begin the process of determining your future. You should not procrastinate: Time and events have a way of passing us by if we are not alert.

Don't overlook the fact that your management and your organization are often more than willing to help you to learn and to help you to grow. After all, competent, highly motivated employees are difficult to find and to keep.

You have already proved your value to the organization, and now you should work to capitalize on that value. Remember, to a great extent, your future is what you make it.

Murray is director of management information services for Ray-O-Vac Corp., Madison, Wis. He is responsible for worldwide MIS activities. Murray has 21 years of DP experience, 10 of which have been devoted to the management of data centers.

HUMAN CONNECTION/Jack Stone†

DP 'Doers' Should Be Encouraged, Rewarded

My article on motivation, "Hard Work, Self-Study Sometimes Pay Off," [CW, Aug. 8] drew some interesting responses from readers. William A. Delaney, president of Analysis and Computer Systems, Inc., located in Bedford, Mass., was one such reader.

"I read your recent article with interest, and I agree with what you say," he said. "The self-motivated and dedicated individual generally rises, like cream, to the top of the organization bottle. It always has been so and will continue to be, I hope, in spite of the general tendency in education and commerce today to homogenize the group in trying to make everyone the same. All are not the same."

"There's an old saying in business that goes something like this: 'In any organization, 10% of the people do 90% of the work.' From over 30 years in the work force, I can testify to the truth of that statement. Sales managers report that 20% of their salesmen get 80% to 90% of all sales for their companies."

"Are they born under a lucky star? Do things come easy for them? Some say so, but they are wrong. The harder you work, the 'luckier' you get. That's another old truism that bears repeating now and then."

Human Element

"The human element, the individual, is by far the most important factor in the success of any venture. The self-motivated, self-disciplined and dedicated person will, one way or another, get his job done and done well. He seems to have inner resources to call upon when necessary, and he does it time and time again."

"As described in the article, such a person may eventually leave the job where he had worked so hard, because his immediate supervisor holds him back."

"Sometimes this happens to many hard-working and motivated people. Some lazy or less dedicated superior in middle management tries to put the lid on the fireball because the manager mistakenly looks upon him as a threat who will flash past the

manager to higher positions if higher authority ever recognized what it had in this very valuable person."

Reward Them

"Top management would be well advised to recognize and reward such people early on, to encourage them and to motivate them further. They are very valuable people to have around."

"Their energy and dedication can be catching, as others try to keep up with them. They are like yeast in bread — they make the whole loaf rise. They are called the 'doers.'"

"Unfortunately, sometimes such people get turned off or they go elsewhere when they do not receive adequate recognition and reward for such high dedication and performance. It's like loyalty: You cannot buy it at any price. That's what makes it so precious."

"However, when you recognize that you are getting it freely and willingly, you certainly can and should reward such a person."

"It's a happy combination of cir-

cumstances that makes the recognition and reward not only a smart business decision, but correct from an ethical position as well."

Better Under Pressure

"These doers also have one other very important characteristic. When the pressure is on, they get better. Others tend to call in sick or request reassignment or even suddenly resign when things get difficult. Any manager can tell you that he spends half of his time shielding and protecting his people from outside pressures or distractions so they can work undisturbed."

"Pressure doesn't bother the doers; he seems to thrive on it."

"Come payday, the doer doesn't seem to do any better than his less dedicated peers or superiors. The doer gets his sense of dedication long before we ever meet him."

"Three cheers for such people. They are pure gold."

Letters to Stone should be addressed to him at P.O. Box 33699, Washington, D.C. 20033.



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LETTERS

Prosecute Them

I am extremely upset after reading the article "Hacking: Mark of Genius or Plain Theft?" [CW, Sept. 12].

In answer to the question posed in the headline, the answer unequivocally is plain theft.

The *Star Wars* verbiage, "Dark Side of the Force," clearly illustrates that Geoffrey Goodfellow, SRI International, Inc. researcher, lives in a world of fantasy. It is pure fantasy to feel that a person should not be responsible for his actions. This applies to all trespassers and especially to "hackers."

Goodfellow states that he was a hacker at one time. Perhaps the fact that he so willingly admits to unethical, if not illegal, behavior explains his attitude that these trespassers are simply satisfying their intellectual curiosity.

He states that they intend no harm. Would he feel the same way if one of the "teenage loners that is not appreciated by his parents, teachers and peers" took his automobile for a joyride? Would he feel the same way if his personal privacy were encroached upon by a voyeur peering through the windows of his home? Would he feel the same way if someone ran up charges on his credit cards or telephone?

Goodfellow's statements that if hackers are detected, he should "attempt to befriend them," is ridiculous. The proper attitude is to prosecute them. I feel reasonably confident that Don Parker, also of SRI, would not have the same benevolent feelings if hackers penetrated SRI's system. If Goodfellow is burglarized, will he attempt to befriend the burglar to "find out exactly what he was looking for?"

Processing resources are paid for by companies at a great expense, and they have the exclusive right to determine who may or may not use these resources. The unauthorized use of property is wrong. This applies to Goodfellow's personal property as well as to the property of all the companies that have computers.

His statement that if we erect barriers to the hackers, they will see it as a challenge, and it will in all likelihood cause the hackers to become vindictive and cause irreparable harm makes me respectfully request that the name of my company be withheld to protect it from those individuals that Goodfellow admires so much.

J.W. Savage
Data Security Administrator
Northridge, Calif.

Invasion of Privacy

The article "Hacking: Mark of Genius or Plain Theft?" [CW, Sept. 12] states that "In truth, most hackers are a reasonably responsible, admirable bunch whose actions are motivated mainly by curiosity and seldom pose a serious threat to the objects of their scrutiny."

Therein lies the basic problem with modern society — the belief that anything is OK as long as nobody gets hurt and/or you don't get caught.

Fundamentally, personal or industrial-commercial privacy is being invaded. Hackers have no more right to their "harmless" activities than the Peeping Tom, the party-crasher or the person who steals another's property because "he's rich and can afford it." All hacking on someone else's property is wrong, period.

The problem exists not only with hackers, but with everyone who shares the belief that it's OK if no one gets hurt.

W.C. Gelsleichter

Kingston, N.Y.

Breaking But Not Entering

The amount of space *Computerworld* devotes to "hacking," and the reactions of its readers, never ceases to amaze me. Typical is Bennet N. Babcock's letter: "What they are really doing is breaking and entering" [CW, Sept. 26].

There, in a nutshell, is the whole misunderstanding. These kids are entering all right, but certainly not breaking, because there is nothing to break in nine out of 10 systems. If Babcock goes on vacation with the doors to his house open and the key in his motorboat, he will have a hard time getting a conviction on silver thieves or joyriding kids. How would Babcock feel about his bank if it left the doors to the safe unlocked?

Yet, for decades, DP managers, aided and abetted by an irresponsible computer industry, have left billions of dollars' worth of information sitting in their data banks in clear Ascii or Ebcidic. Unscrambled, the data is daily being broadcast over satellites to anybody who bothers to tune in.

These folks should be grateful to hackers for pointing out their errors before somebody serious (like the Internal Revenue Service or the Mafia) takes advantage of them.

Experts assure me that security measures against hacker access cost no more than \$2 per terminal.

Max Schindler

Prime Technology, Inc.
Boonton, N.J.

Defining 'Hacker'

I am aware that *Computerworld* has no need to bother with small details such as the meaning of a word, but people who break into computer systems are not called "hackers" — they are called criminals.

A hacker is merely a programmer who is completely in tune with computers and is capable of programming almost intuitively (whatever that means), a person who can sit down at a terminal and write a well-structured, readable and efficient program that might take a lesser soul a week to write. A hacker is not, per se, a criminal.

A hacker is also not necessarily a "Silicon Valley guy," the sort of person who puts up a cot in the computer room so as to spend more time at his work and life — the computer. Some hackers are like this, and this has led people to believe that this is what a hacker is.

Peter da Silva

Houston, Texas

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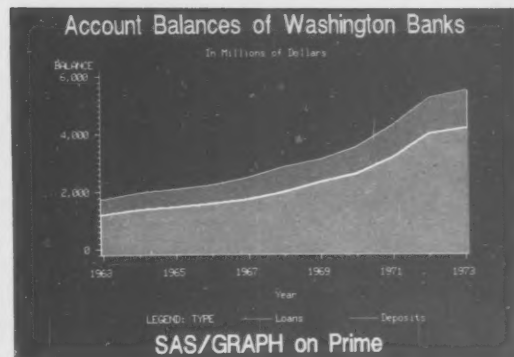
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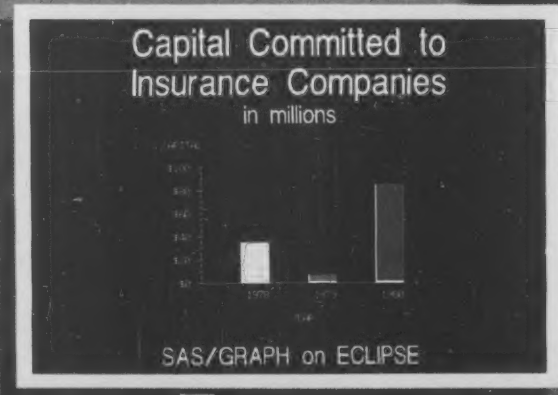


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READER COMMENTARY

The Ongoing Debate Over DP Certification:

According to *Computerworld's* editorial "Stop Dangling Carrots" [CW, Sept. 9], "In an industry filled with overflowing with acronyms and cryptic abbreviations, two three-letter terms — CDP [Certificate in Data Processing] and CCP [Certificate in Computer Programming] — are currently the source of

much debate. And for good reason."

The Institute for Certification of Computer Professionals (ICCP) agrees that the whole issue of certification should be the "source of much debate." And it would hope that the criticism that arises in the debate would be objective and constructive.

References for the statement regarding "much debate" would be appropriate, but certification is really a non-issue.

The editorial also states, "Unfortunately, although the idea behind the tests and certification — to instill professionalism within the data processing industry — is a

good one, reliance on a single test and a paper award to achieve that goal is a bit optimistic, if not impossible."

The ICCP has never represented its tests as the sole measure of professionalism. Nor has it claimed that certification is any better than any of the other elements of professionalism. The ICCP's

recent position papers very specifically attempt to dispel that myth: "ICCP recognizes, as part of its charter, the promotion of professional development through certification and related programs. . . . ICCP recognizes that certification alone is not a complete measure of professional competence."

In addition, the ICCP's charter documents and its publication "Certification and You" emphasize that certification is but one activity in a professionalism spectrum that includes job definition, curriculum development, accreditation standards, formal education, testing and certification, continuing education and self-assessment and recertification.

Necessary Resources

The editorial goes on to say that "In fact, the ICCP recently conceded that it 'lacks the necessary resources' to keep its certification programs up to date with the highly volatile information systems industry [CW, Aug. 29]."

It is not a fact that the ICCP conceded it lacks the resources to keep its certification programs up to date. Neither the CW Aug. 29 story nor the position paper on which it is based make any reference to a concession regarding keeping its certification programs up to date. The news release on the position paper states, "ICCP presently monitors the currency of its two certification examinations. The CDP council updates one of the five sections of the CDP examination every year, while the CCP council reviews and updates the CCP exam content every two years."

The ICCP's position paper press release clearly states, "Recognizing that multiple certifications will be developed for the computing and information systems profession and closely related fields, the ICCP position paper acknowledges that some of these programs will be developed by ICCP and some will not, because the institute lacks the necessary resources."

Why has CW, as the watchdog of the industry, failed to inquire as to how the ICCP keeps its tests and certifications current?

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- Questionnaires to new and old certificate holders.
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Tests Not Sole Measure of Professionalism

pants to question generation sessions.

With regard to the ICCP's "lack of resources," it should be pointed out that the ICCP was created and given a charter without the resources to do the whole job. That has been a fact since Day One. Other than fees paid by candidates for examinations (and the examinations are not money-makers) and limited assistance from its constituent societies, the ICCP has no financial resources.

According to the editorial, "As a remedy, the organization suggested a number of alternatives to the single-test, single-award system; chief among them is a so-called Capstone certification that would recognize professionals 'who have distinguished themselves through outstanding accomplishment and demonstrated knowledge' — a sort of Academy Award for lifetime achievement."

The reference to the "so-called Capstone certification" was taken out of context. Both the position paper and news release clearly state that "ICCP recognizes a need for a Capstone designation that should be earned according to a well-defined combination of certification, education and documented accomplishment."

Categories of Certification

The paper then identifies a certification architecture that can be specified with four major categories of certification:

- Capstone.
- Specialist — data entry, computer security and telecommunications.
- General — the ICCP CDP and CCP.
- Entry-Level — directed toward persons first entering the computing and information systems professions.

In other words, the Capstone designation was suggested as a culminating designation after the other requirements had been achieved.

Extreme liberties have been taken with the ICCP's efforts to define an overall architecture for testing and certification within the profession. The ICCP believes that all levels of skill within the profession should be subjected to some type of knowledge testing. It is seeing a proliferation of certification (data entry, computer security) and other testing (aptitude, predictive skills validation) that all fit within the fabric of professionalism.

There are people within the industry and profession who are seriously concerned with this situation. They are looking ahead to the day, not yet here, when the industry has to stand accountable to its employees and the public for the skills and credentials of its practitioners.

The CW editorial states, "Perhaps the ICCP and other organizations that promote data processing certification, like the Data Entry Management Association, should take a harder look at data processing professionalism before promoting certificates, gold stars and merit badges that do little besides inflate a re-

'Extreme liberties have been taken with the ICCP's efforts to define an overall architecture for testing and certification within the profession. The ICCP believes that all levels of skill within the profession should be subjected to some type of knowledge testing. It is seeing a proliferation of certification . . . and other testing . . . that all fit within the fabric of professionalism.'

sume."

The ICCP's Strategic Planning Committee has already taken a hard look at the overall professionalism picture. It rejects the implication

here that the ICCP promotes certification above all and that it is downplaying the other essential elements of professionalism.

The ICCP's charter and other docu-

mentation clearly state that its piece of the overall professionalism picture (job definition, curriculum development, accreditation standards, formal education, testing and certification, continuing education, and self-assessment and recertification) is certification/recertification. The ICCP's constituent societies have repeatedly and very clearly reaffirmed this focus. Therefore, all other professionalism activities are beyond the ICCP's charter.

A casual perusal of its basic documents would have made this obvious — to wit, "ICCP has never claimed

(Continued on Page 52)

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Examining DP Certification

(Continued from Page 51)

that certification tests measure competence of computing personnel ... certification alone is not a measure of competence ... ICCP recognizes, as part of its charter, the promotion of professional development through certification programs."

Among the ICCP's other certification-related contributions to professionalism are the areas of codes of ethics and standards of good practice. The ICCP has repeatedly voiced the need for the profession to develop workable standards of good practice to provide the mechanisms for self-policing. Of all the organizations representing the profession, the ICCP is the only one to have policed its members and withdrawn a certification.

A significant point here is that despite the fact that the ICCP has been chartered to develop certification programs for the profession, other organizations are developing exams outside of the ICCP's charter. This is where the ICCP's financial resource limitations impact. Consequently, it is seeing a wide variance in the nature of certifications.

Full-Time Educators

The editorial continues, "These organizations might perform more of a service if they were to take the helm as full-time educators, stressing the benefits of continuing education and work experience rather than the carrot of a paper certificate. They might even join forces with the many universities and colleges across the country that have successfully altered their business data processing programs to keep up with the fast pace of computer technology or have started programs that lead to graduate degrees in information processing and [MIS]."

The ICCP's board of directors is comprised of a cross-section of the computing and information systems profession — educators representing small colleges and large universities, computer engineering societies, business, industry and government.

Of the half-dozen standard curricula available in computer and information systems, the ICCP board members were heavily involved in the development of at least three of them. William W. Cotterman of Georgia State University (GSU) in Atlanta was chairman of GSU's information systems department when he chaired the ICCP certification council that developed the three CCP certification examinations (business, scientific and systems programming specializations). He is now secretary of the ICCP and represents the Association for Computing Machinery (ACM) on the board of directors. Cotterman served on the standard curriculum committee that developed the report on "Information Systems Curriculum Recommendation for the '80s: Undergraduate and Graduate Program," published in 1982, Vol. 25, No. 11 in the communications of the ACM.

Joyce Currie Little of the math and computer science department, Towson State University in Baltimore, chaired the committee that wrote the recommendations and guidelines for the associate-level degree curriculum in computer programming. She represents

ACM on the ICCP board of directors.

Richard Austing, a former chairman of the CCP council, was one of the editors of "Curriculum '78: Recommendations for the Undergraduate Program in Computer Science," published in March 1979 in the communications of the ACM.

According to the editorial, "the companies doing the hiring obviously have little faith in certification programs. This is demonstrated by their lack of support for the ICCP's efforts."

The ICCP acknowledges that for individuals with DP skills, it is currently a seller's market. Demand far exceeds supply and evidently will for some time. Under those circumstances, who needs certification? The individual does not need it to get a job and, with so few people available, employers have been happy just to get a warm body. Individuals are seeking certification only for individual improvement, personal assessment, professional commitment or any number of similar self-motivated reasons.

Who Needs Certification?

But who really does need certification? Those dependent upon the products and services rendered by the computing and information systems industry — the corporate consumer and the general public.

The ICCP is encouraged by increasing corporate support of its programs. Johnson & Johnson, State Farm Mutual Auto Insurance Co., All-State Insurance and Pacific Northwest Bell Telephone all render support in encouraging participation and reimbursing the cost of the test, and all review materials for successful certification candidates.

State agencies in Illinois and Washington accept the CDP in lieu of a master's degree in their hiring practices, and Tennessee Technology University and Salt River Project Corp. in Tempe, Ariz., accept the CDP in lieu of a bachelor's degree.

A number of colleges and universities, including Millikin University in Decatur, Ill., and the University of the District of Columbia, accept the CDP as a terminal qualification for teaching courses in computer information systems. The Naval Postgraduate School in Monterey, Calif., requires its students in information systems to sit for the CDP exam prior to graduation. Two recent ads in *The Wall Street Journal*, advertising for MIS positions, required an "MBA or CDP certificate" for job qualification. There probably is a great deal more support of certification.

Naturally, the ICCP would like to see more support. What business support there is, however, is overwhelmingly more than that provided by the DP industry. If the DP industry is getting nothing from the ICCP, then it is receiving exactly what it has put into it. The industry has consistently rebuffed the ICCP's pleas for financial assistance.

The editorial concludes that "Professionalism is not something that can be tested, awarded or hung on a wall."

The ICCP says "Amen."

Campbell is president of the ICCP in Chicago.

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Global Software Extends Its 'General Ledger System'

RALEIGH, N.C. — Global Software, Inc. has announced Quick Close, Profit Planning and Budgeting, Real-Time Reporter and On-Line Graphics as additions to its General Ledger System.

Quick Close allows the accountant to make real-time adjustments and update the accounting reports with the adjusted figures. The on-line Profit Planning and Budgeting provides the financial analyst with the ability to perform "what-if" planning, a spokesman said. In addition, the system offers forecasting techniques such as time series and bivariate regression analysis in an interactive mode.

The Real-Time Reporter offers both the specification

and execution of reports on-line. Some features include cloning (propagating existing reports with minor changes) and scanning (reviewing desired reports through the screen).

The Graphics feature was designed to interface with the IBM Graphical Data Display Manager and offers line graphs, scatter-plot graphs and bar charts, the vendor said.

The software runs on IBM's 360, 370, 4300 series and 30 series mainframes. The price ranges from \$3,500 to \$12,000.

Further information is available from Global Software, located at 1009 Spring Forest Road, Raleigh, N.C. 27609.

'Ingres/Net' Provides Access to Remote VAXs

BERKELEY, Calif. — Relational Technology, Inc. (RTI) has introduced Ingres/Net, a software package that is said to give users of the company's Ingres relational data base management system (DBMS) distributed access to remote data bases on any Digital Equipment Corp. VAX-11 superminicomputer in a network connected by Decnet.

Ingres/Net allows functions to be distributed, a spokesman said. Applications can run on the user's local system, and the Ingres DBMS can run remotely, enabling communication costs to be reduced and response times to be improved. Ingres can be used to distribute and share data over many computers in a local or remote network.

RTI said the user does not see the network but only needs to specify the node and data base name. Features include automatic DBMS process creation and deletion, automatic remote logon/logoff and security checking, automatic message management and automatic error handling.

User interfaces such as Ingres/Reports, Ingres/Graphics, Ingres/Query and Ingres/Applications-by-forms can be used to display, update or retrieve data stored on any VAX-11 in a network, the spokesman said.

RTI said Ingres/Net will soon be available for Motorola, Inc. 68000-based microcomputers supporting Ingres in the Unix environment. Enhancements will also give VAX-11s

(Continued on Page 54)

Study Sees Stronger Data Base Demand

By Paul Gillin
CW Staff

NEW YORK — Current annual expenditures for on-line data base services are far below potential, and growth in data base usage will average 47% over the next five years, according to a study released by Frost & Sullivan, Inc.

"On-Line Data Base Systems Market in the U.S." predicted that substantial growth potential exists in the areas of education, accounting, law, banking, consulting, insurance and light manufacturing. There appears to be little need for additional data bases in the areas of engineering and medicine.

Data bases with the largest user audiences are currently in the areas of chemistry, education, medicine, general statistics, demographics and technology, the survey said. However, it noted that many users are unaware of the amount and range of information now available on-line.

Dissatisfaction with network transmission services could hamper the growth of certain on-line data bases, the report warned. Most of the more than 500 users who responded to the survey were dissat-

isfied with the quality of their network transmission services. In the professional/research market in particular, which relies heavily upon outside networks, this problem could inhibit growth, the survey said.

The survey confirmed that the intermediary or researcher is the primary user of data base services in most organizations. However, the report predicted that advancement in microcomputer technology will shift the information retrieval function slowly to the end users.

Variety of Support Services

In line with this, vendors are cultivating this new user base with a variety of support services. They include:

- User-friendly software for search and retrieval.
- Extensive user-training programs.
- On-line document ordering services.
- Private data base services, which allow users to compare and interrelate internal and external data.

There were approximately 1,150 data bases on-line by the end of 1982, with the last four years seeing the most spectacular rate of growth, the report noted. The next

five years will see expansion and refinement of existing data bases with less emphasis on the creation of new data bases.

The growth and refinement of transmission services, such as GTE Telenet Communications Corp.'s Telenet and Tymshare, Inc.'s Tymnet, will directly influence the growth of data base usage, the report predicted. Tymnet's recent announcement of plans to expand its packet-switching service to 150 additional cities could add thousands of potential users to the on-line data base world.

Significant growth is possible in the full-text data base market. Technological advances in data conversion, storage and delivery systems will make the production of full-text data bases more economical for print publishers. Numeric data bases should continue to expand steadily. However, bibliographic data base production should slow down considerably, the report predicted.

Currently, there are many different players in the on-line data base market. However, as the industry matures, the field will consolidate somewhat, and larg-

(Continued on Page 54)



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'File Transfer Utility' Unwrapped For Series 700 PWS From Lee Data

MINNEAPOLIS — Lee Data Corp. has announced the enhanced File Transfer Utility for the company's Series 700 Personal Workstation (PWS), which is said to add IBM-compatible personal computing capability to existing IBM 3278 and 3178-compatible terminals manufactured by Lee Data.

The bidirectional mainframe-to-PWS file transfer capabilities provide users with software tools to transfer either text or transparent data in a variety of IBM operating environments. Those environments are: DOS/VSE using ICCF; DOS/VSE with CICS; MVS using TSO Edit; MVS/OSI with CICS; MVS with TSO; and VM/CMS with the Type or

Xedit utilities.

The package is said to be designed as a two-level utility that allows users to select from company-supplied transfer routines or to create their own file transfer routines with Lee Data-supplied tools. Those routines are said to be for users with minimal mainframe or PWS software knowledge. With the company-supplied tools, Lee Data said most host environments can be addressed for mainframe-to-PWS file transfer.

The package is available for a one-time charge of less than \$1,000 at the host end and a one-time per terminal charge of \$125 per CRT. Lee Data is located at 7075 Flying Cloud Drive, Minneapolis, Minn. 55344.

General Ledger Update Out for IBM System/34, 36

ROCKPORT, Mass. — Para Research, Inc. has announced Release 1.4 of the General Ledger Financial System for the IBM System/34 and System/36.

According to the company, the new release is suited to both single and multicompartment businesses. Among the enhancements is the strategic ratio management module for analysis of financial position based on general ledger balances. The module is said to produce 30 ratios used to determine financial position, including quick ratio, financial leverage ratio, debt to equity ratio, inventory turnover and the du Pont model.

The company said the General Ledger System can process multiple companies, each with a different chart of accounts, different financial statements and different fiscal calendars.

It also allows users to design a variety of financial statements and balance sheets, and income statements can be printed with current figures compared to the previous year and budget.

Financial statements can also be printed with current figures given as a percentage of another line item, and each company on the system may use a different line item for the comparison.

The system is said to interface with other Para Research accounting software such as accounts payable, accounts receivable, payroll and fixed assets.

The new release is priced at \$1,200. More information is available from Para Research, which is located at Whistlestop Mall, Rockport, Mass. 01966.

Study Covers Data Base Mart

(Continued from Page 53)

er vendors will become dominant, the report concluded. There is already a tendency among professional/analytical and professional/research producers to acquire and expand into new markets.

On-Line Specialized Data Bases

More publishing companies will enter the field of on-line specialized data bases. Producers with specialized products in strong market areas will develop on-line delivery systems to distribute their data bases and those of small producers in their market category, the report predicted. The authors also predicted more joint data base production efforts between print publishers and on-line vendors.

However, there are still opportunities for small producers of numeric data in the professional/analytical market segment. Major producers will concentrate more on providing powerful data management and decision support systems, relying on small vendors for data base production and expansion.

The 286-page report costs \$985 from Frost & Sullivan, located at 106 Fulton St., New York, N.Y. 10038.

RTI Introduces 'Ingres/Net'

(Continued from Page 53)

running under either the VMS or Unix operating systems transparent access to remote data bases.

Ingres/Net is available to Ingres users at a cost of \$5,000 for a supported license for the first node. Additional nodes cost \$2,500 each for an unsupported license from 2855 Telegraph Ave., Berkeley, Calif. 94705.

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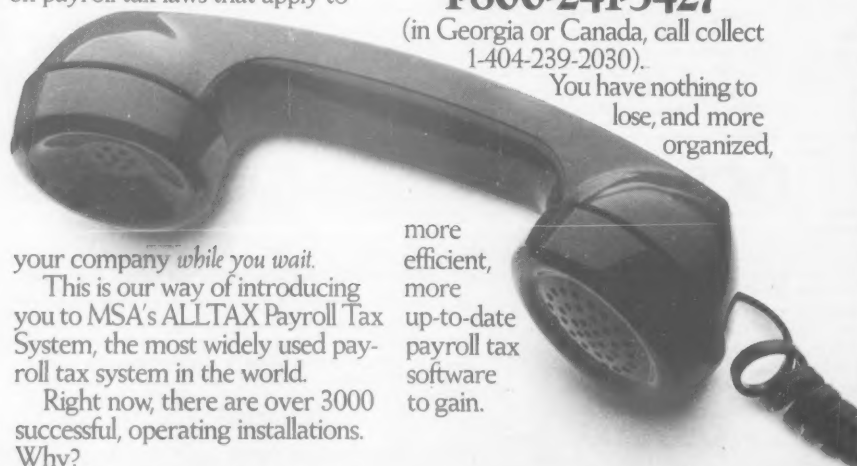
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On-Line Testing Utility Out For CICS, Total Users

MISSION VIEJO, Calif. — LRB Systems, Inc. has announced the Total Utility File Facility (Tuff), an on-line testing and debugging utility for users of IBM's CICS and Cincom Systems, Inc.'s Total data base management system.

Tuff allows the user to view and update on-line records in Total, display data base statistics, check and repair broken chains, perform record and file searches and delete records and chains, the vendor said.

The price of the utility is \$3,975. Further information is available from LRB Systems at Suite B-155, 25108 Marguerite Pkwy., Mission Viejo, Calif. 92692.

At Info Management Expo

Prices of Omnilink Modules Out

NEW YORK — On-Line Software International, Inc. announced the price schedule for its Omnilink modules during the recent Information Management Conference & Exposition here.

The modular CICS application provides for transfer of files from mainframes to IBM Personal Computers, document exchange with the Wang Laboratories, Inc.

word processors and other messaging and filing.

Prior to Nov. 30, the three modules can be purchased as a package for \$35,000 for IBM OS systems and \$28,000 for DOS systems. After Nov. 30, the prices will be \$52,000 for OS and \$40,000 for DOS.

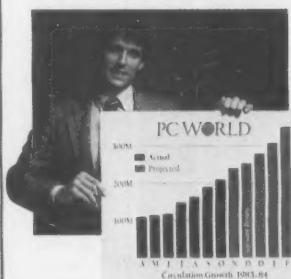
Purchased individually, Omnilink PC Link for File Transfer costs \$30,000 for OS systems and \$24,000 for DOS

systems; Omnilink Document Exchange costs \$23,000 for OS and \$17,000 for DOS; and Omnilink Electronic Mail is priced at \$35,000 under OS and \$28,000 under DOS.

More information is available from On-Line Software International located at Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

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*Source of data: Independent Reader Survey, July, 1983.

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Software Series Offered For IBM System/34, System/36

WINTER PARK, Fla. — Westmoreland Systems, Inc. has announced the following software for the IBM System/34 and System/36:

- 3D Doc 34/36 — Data dictionary documentation that includes data dictionary, flow charting and nested procedure exploder. The price is \$750.

- Autodoc 34/36 — Similar to the 3D Doc but without the data dictionary, the product includes on-line user instructions and an indicator usage program. It is priced at \$500.

- Calendar Scheduling 34/36 — Organizes appointments, dead-

lines and meetings according to date and time. The price of the scheduling software is \$300.

- Doc-U-Find 34/36 — Instant location of contracts and documents organized by key words. The price of this product is \$300.

- Report Right 34/36 — A report generator. It carries a \$1,550 price tag.

- Letter Resources II — A word processor for Systems 34, 36 and 38. The price is \$1,550.

Further information on the products is available from Westmoreland Systems, Suite 1, P.O. Box 2726, 228 Park Ave. N., Winter Park, Fla. 32790.

MSA Accounts Receivable Runs Under Cullinet IDMS

ATLANTA — Management Science America, Inc. (MSA) has announced an accounts receivable system that runs under Cullinet Software, Inc.'s IDMS data base management system.

The system is an on-line, real-time update system that provides accounts receivable and credit management tools, which include on-line exception reporting of past-due and over-credit accounts, a detailed statistical payment history for order approval and payment trend analysis and automatic generation of maintenance of credit lines. Sales revenue accounting and cash application entries can be journalized for automa-

ed entries to general ledger.

The price ranges from \$50,000 to \$120,000 from MSA, 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

IBM Users Get Coding Assist

SIOUX FALLS, S.D. — Carriers Service Bureau, Inc. has announced a programming aid for IBM System/34 and System/36 users that reportedly assists programmers in writing and modifying computer procedures and programs written in RPG-II.

Proscan reportedly is designed to read the procedures and programs within a certain user library and to list the data files accessed and used by each procedure and program. A spokesman said the product enables users to identify which files, procedures or programs need to be accessed in order to complete program development and modification.

The product is available for \$95 from Carriers Service Bureau, 3421 Hovland Ave., Sioux Falls, S.D. 57107.

CIC Introduces Benefits System

NORTH HOLLYWOOD, Calif. — California Interactive Computing, Inc. (CIC) has introduced an automated system designed to determine permanent disability benefits for workers' compensation. The system runs on Pick & Associates, Inc.'s Pick operating system on a variety of computers.

CIC's Permanent Disability Rating System (PDRS) quantifies the elements while incorporating an override function that allows the examiner to inject subjective judgments into the rating process, a spokesman said.

When a worker's disability progresses to a permanent level, he receives a rating that is expressed as a percentage of loss, which is a reflection of his inability to perform duties in the same manner as before the disability.

The percentage is then converted to the number of weeks' benefits to which the claimant is entitled at the weekly permanent disability rate.

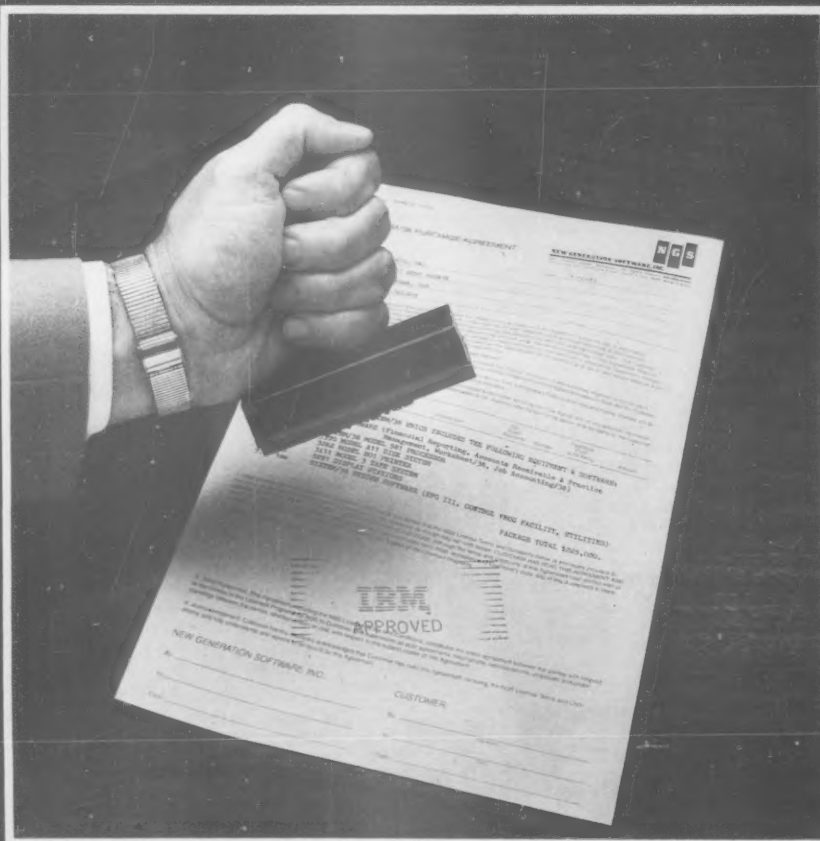
The PDRS is based on tables stored in its data base, which comprises approximately 70 programs. At any point the examiner can override the system calculations and inject subjectivity to allow for individual variations from the schedule.

The examiner inputs the body part affected, the medical report data, the age of the worker and the occupational data. The program then cross-references all the factors.

The PDRS includes special features that alert the examiner to factors such as overlapping work restrictions and multiple disability ratings and instruct the examiner how to proceed.

CIC's PDRS is available at a price of \$11,000 from the vendor at 12517 Chandler Blvd., North Hollywood, Calif. 91607.

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System Targets Medical Uses

ATLANTA — American Computer Tech, Inc. and Cybermed Systems have jointly announced the Med-Master medical system for retention of patient medical information.

Running on IBM minicomputers, the system begins on the System/23 Datamaster, which can accommodate 4,000 active patients with an initial cost of \$16,000.

The hardware can grow to a 30M-byte fixed disk (120,000 patients) with four terminals and eight printers, which costs \$40,000 with software.

Further information is available from American Computer Tech, Suite 134, 4250 Perimeter Park S., Atlanta, Ga. 30341.

Package Extends HP Protocol Tool

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced software for its HP 4955A protocol analyzer.

The Option 004 eliminates some features not required in communications and network design centers, a spokesman said. The new application software package extends the capabilities of the HP 4955A, both standard and Option 004, by adding specialized protocol decode and display software. With the package, it can decode IBM's Systems Network Architecture, Digital Equipment Corp.'s DDCMP and HP's HPDLC protocols. Network monitoring can also be done.

The HP 4955A Option 004 eliminates one tape drive and the field-service pouch from the HP 4955A.

The configuration includes the data-code application program for creating 5-, 6-, 7- and 8-bit custom data codes already standard with the HP 4955A.

The HP 4955A Option 004 configuration is priced at \$17,880 with delivery eight weeks after receipt of order. The Basic language option is reduced from \$2,015 to \$1,200.

The standard HP 4955A protocol analyzer, which includes the new protocol decode tape, is priced at \$18,680, a price reduction of \$2,270. The HP 18144A protocol decode tape is available at \$250 to upgrade previously purchased HP 4955As.

More information is available from HP at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

DG Introduces Version of Mumps For WP on AOS Operating System

WESTBORO, Mass. — Data General Corp. has introduced the Mumps System, an interpretive language designed for execution of programs

that retrieve and manipulate string data from random-access data bases.

Mumps is an Ansi-standard implementation of Mumps, which offers word processing, office automation, communications and the Mumps language on the same system. It operates under the company's AOS and AOS/VS operating systems.

The product was designed to run on the vendor's Eclipse computers, the Eclipse/MV family and selected models of Desktop Generation computers.

The initial license fee for AOS/VS Mumps is \$10,000, and subsequent licenses are \$7,500. For AOS Mumps, the initial license fee is \$9,000, and subsequent licenses are \$7,000, the vendor said.

Further information is available from Data General, 4400 Computer Drive, Westboro, Mass. 01580.

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'Hilo-2' Ready For IBM, Prime

CONCORD, Mass. — Genrad, Inc. recently announced that its Hilo-2 high-speed logic design simulator, introduced earlier this year for Digital Equipment Corp.'s VAX-11 systems, is now available for varied systems manufactured by IBM, Apollo Computer, Inc. and Prime Computer, Inc.

A logic software simulation system, Hilo-2 reportedly aids in the engineering, design verification and testing of digital electronics in semi-custom integrated circuits.

The package includes language for functional modeling, gate-level and functional-level logic design simulations, timing verification and fault simulation for test validation, according to a Genrad spokesman.

Prices for typical systems packages range from \$18,000 for Apollo computers to \$145,000 for IBM computers. More information may be obtained from Genrad, 300 Baker Ave., Concord, Mass. 01742.

Prices Reduced On 'APL*Plus/2000'

ROCKVILLE, Md. — STSC, Inc. recently announced 60% to 70% price reductions on its APL*Plus/2000 systems for Digital Equipment Corp.'s VAX-11 computer series.

License prices for the systems now start at \$4,600, which includes PL/I source code.

Further information can be obtained from STSC, which is located at 2115 E. Jefferson St., Rockville, Md. 20852.

Has Personal Computer Link

Firm Announces Financial System

SUNNYVALE, Calif. — Data Design Associates has announced the General Ledger Financial Control System.

The company said the system's personal computer interface provides data in the format required by any personal computer software product that can access the data base of a mainframe computer. This is said to allow users to utilize products supplied by a number of microcomputer software companies, enabling corporate clients to integrate their mainframes with micros without limiting them to one particular type.

The system is said to incorporate English-like commands, a personal computer interface and on-line data entry and inquiry, which al-

lows users to customize terminal screens without affecting the programs. The system will automatically produce documentation reflecting changes, a spokesman said.

The system includes an Automatic Interface module (DD-AIM) and a Statement Analysis Reporting module (DD-Star). The company's Data Mapping Facility

(DMF) concept provides external tables to allow users to define input to the system as well as master file layouts.

Installations of the General Ledger Financial Control System will begin the first quarter of 1984, with a base price between \$60,000 and \$86,000. Data Design Associates is located at 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086.

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'PC/Focus' Enhanced For Micro

NEW YORK — Information Builders, Inc. has announced Version 8.0 of PC/Focus, an applications development package for users of IBM Personal Computers. The package is a complete implementation of Focus, the firm's application development, file query and data manipulation package for IBM mainframes.

With Version 8.0 of PC/Focus, up to 16 separate Focus data bases can be relationally joined for ad hoc query and reporting. Data bases can be joined with a single command that provides the user with access to all data fields in the files, the vendor said.

In addition, Version 8.0 also provides an improved PC/Focus communications link called Dial. Using a series of menus, Dial enables Personal Computer users to communicate with mainframe Focus for uploading or downloading data, the vendor said.

PC/Focus is a stand-alone package which requires a minimum of 512K bytes of main memory and a 5M-byte hard disk. Version 8.0 costs \$1,595 for a single copy, the vendor said from 1250 Broadway, New York, N.Y. 10001.



KEY TRONIC Enhances The VT-100* Keyboard



Enhance your DEC VT-100* with a Key Tronic keyboard peripheral. This detached, low-profile keyboard is plug-compatible with the DEC VT-100* terminal and meets new ergonomic specifications. It also features reliable microprocessor electronics, solid-state capacitive switches, and positive tactile feedback.

Suggested Retail Price: \$379.00

To order Model KB-100, call Toll Free 1-800-262-6006 for the retailer closest to you. (7 am-3 pm Pacific Time)
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Henco 'Info' Gets Color Graphs

WALTHAM, Mass. — Henco Software, Inc. has announced a relational graphics management package that is said to integrate Info, Henco's relational data management system and fourth-generation language, with full-color graphs.

Called Info-Versagraph, the menu-driven product offers high-level integration with Info, a spokesman said. Graphs can be plotted from

ad hoc figures entered at the time of graph creation, from data in existing Info data files or from a combination of both sources.

Using Info interactive query facilities, the contents of an Info data file can be regrouped so the desired elements are singled out for graphics, the spokesman said. A single command invokes Info-Versagraph.

The facility includes a library of over 100 predefined graph templates (platforms). When a standard platform is selected, Info-Versagraph displays a series of prompts for title, legend, text and plot data items. Prompts also ensure that the correct data is entered for each graph in platforms with more than one graph element.

Standard platforms can be defined for all system users, and local platforms can be created for a single user or department, the spokesman said. A menu-driven subsystem allows modification or creation of new platforms to be performed.

A variety of graphic output devices are supported. Info-Versagraph is compatible with Prime Computer, Inc. systems with Info Revision 9. Availability on the Harris Computer Corp. VOS series and Digital Equipment Corp. VAX-11 series computers is scheduled for 1984.

The product is priced at \$10,000 for Prime 150 through 9950 systems and \$8,200 for Prime 2250 systems from Henco at 100 Fifth Ave., Waltham, Mass. 02154.

'DNA-4' Available on DG

WESTBORO, Mass. — Data General Corp. has announced the availability of Exact Systems and Programming Corp.'s DNA-4 information management control system on DG's Eclipse, Microclipse and Desktop Generation systems.

DNA-4 includes a data base manager capable of supporting relational, network, hierarchical and associative data models, an applications development facility and utilities.

It operates under DG's Rdos, AOS and AOS/Virtual Storage operating systems and is priced from \$2,000 to \$63,000, depending on hardware, from DG's Information Systems Division, 4400 Computer Drive, Westboro, Mass. 01581.

Module Links Geisco Mail Net To System/34

WALTHAM, Mass. — Orion Software, Inc. has announced the CMGQ/34 (Communication Module for Geisco Quik-Comm) software package, which connects the IBM System/34 to the General Electric Information Service Co.'s (Geisco) Quik-Comm Worldwide Electronic Mail Network.

CMGQ/34 allows a user at a System/34 5251 terminal to both create and receive electronic mail telemessages using a private mailbox on the System/34. Under screen format control, a user can input a message, memo, letter or document and "address" it to any individual or distribution list of individuals who are authorized Quik-Comm users. Messages received from Quik-Comm are placed in the user's private mail-box, where they can be reviewed, printed, rerouted and/or filed in single or multiple files for future referencing purposes, the vendor said.

The cost is \$2,400. Further information is available from Orion Software, Suite 200, 400-2 Totten Pond Road, Waltham, Mass. 02154.

Accounting Tool Operates on Pick

NORTH HOLLYWOOD, Calif. — An integrated accounting software package that is portable across hardware running Pick & Associates, Inc.'s Pick operating system has been announced by Omnar Corp.

Called the Omnar Controller, the package is designed to generate customized reports in the areas of general ledger, time and billing-practice management, accounts receivable and spreadsheet. The package also includes a program that allows an IBM Personal Computer to access the data base of a Pick-based host computer and download data.

The product is said to use English commands to format reports without reprogramming. Data movement and updates are done in real-time. With Omnar Controller, certified public accounting firms can prepare budgeting reports by division, department or profit center; track operational and accounting data; analyze and chart business trends; evaluate investment opportunities; and project cash flow, a spokesman said.

The price ranges from \$4,500 to \$20,000, depending on hardware and Controller enhancements, from Omnar, Suite 100, 12517 Chandler Blvd., North Hollywood, Calif. 91607.

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Note: InSci systems operate in IBM 370, 43XX, 30XX and compatible environments, and are TP monitor independent.

Micro Notes

Pixel Computer, Inc. has announced an additional three programming languages, **Lisp**, **Mumps** and **Office Manager** Software, Inc.'s **Tom Basic** for the Pixel 80 computer system. The software includes an artificial-intelligence language, an embedded data base processor and application language for medical environments and a version of Basic for Wang Laboratories, Inc. computers.

The price for the new languages ranges from \$600 to \$2,000. Further information is available from 260 Fordham Road, Wilmington, Mass. 01887.

Transparent Data Systems, Inc. has announced **Ugraf**, a business graphics utility software program for 16-bit systems. The software allows the user to generate analytical bar, pie, line, scatter and surface graphs for management presentations, financial applications and sales literature using existing files, the vendor

spokesman said.

Ugraf runs under Digital Research, Inc.'s CP/M 86, CP/M and MP/M II and Cromemco, Inc.'s C-DOS operating systems. The software costs \$495 and is available from 15066 Los Gatos-Almaden Road, Los Gatos, Calif. 95030.

SPSS, Inc. has introduced **SPSS/Pro**, a microcomputer version of the company's SPSS system on the Digital Equipment Corp. Professional 350. The system is said to offer transformation, selection and reporting facilities from plots and tables to research and statistical procedures. SPSS/Pro is a member of DEC's Classified Software Program and sells for \$595 from SPSS's Marketing Department, Suite 3000, 444 N. Michigan Ave., Chicago, Ill. 60611.

Action Computer Enterprise, Inc. has announced the availability of **DPC/OS 3.0**, an operating system supporting Digi-

tal Research, Inc.'s CP/M Plus in a multiple-user environment running on Action's multiuser, multiprocessing combination 8- and 16-bit Discovery microcomputers. The company said DPC/OS 3.0 will not run out of dynamic memory and that private drives have been implemented for enhancements of on-line maintenance, arbitrary drive reassignment, password protection and fully independent directory sizes. The retail price is \$595 from Action Computer, 430 N. Halstead St., Pasadena, Calif. 91107.

A software package that is said to enable high-speed transfer of text and program code between dissimilar computers and operating systems has been announced by U.S. Digital Corp.

The **Copylink** package adds down-line loading and other networking features to personal computers, a spokesman said. It includes local data and

program transfers between computers using 8-in. and 5¼-in. diskette formats and supports transfers between Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M operating systems.

The package is priced at \$99 from U.S. Digital, 5899-D S.E. International Way, Milwaukie, Ore. 97222.

Intelligent Software, Inc. has announced that its new series of educational software — **Intelligent Tutor** — is available for shipment. The series is for the IBM Personal Computer, Commodore Business Machines, Inc. Commodore 64, Apple Computer, Inc. Apple II and Radio Shack TRS-80 microcomputers. The series is designed to help students improve comprehension in all areas of high school mathematics. Each package is priced separately, with Algebra I, Geometry, Algebra II and Trigonometry and Advanced Topics priced at \$49.95 and SAT Math priced at \$69.95. The five may be purchased together for \$199.95 from Intelligent Software, 9609 Cypress, Munster, Ind. 46321.

Today's Future Consultants has announced the **Today's Future Mail** system, which the company said enables desktop computer users to use the Electronic Originated Mail (E-Com) service offered by the U.S. Postal Service. The system is available for most computers using Basic by Microsoft, Inc., including Radio Shack's Models 1, 2, 3, 4, 12 and 16, Osborne Computer Corp. computers and the IBM Personal Computer and Personal Computer XT. The package is priced at \$395 from Today's Future, through P.O. Box 29251, San Antonio, Texas 78229.

Digital Research, Inc. has introduced the **Graphics Systems Extension (GSX)** software for the IBM PC-DOS and Microsoft, Inc. MS-DOS operating systems. GSX is said to extend an operating system to include graphics I/O functions, and it allows graphics applications programs to be moved from one computer to another. The retail price of the package is \$90 for the 16-bit version and \$75 for the 8-bit version from Digital Research, 160 Central Ave., Pacific Grove, Calif. 93950.

Alpha Micro, Inc. has made available its **Alphacalc** financial software package for the company's line of multiuser, multitasking microcomputer systems. The multiuser package is said to help prepare cost estimates, financial statements and projections, budget preparations, present-value calculations, cash flow analysis and sales forecasts. The package is priced between \$300 and \$900.

The company also announced that the **Fortran 77** language is now available across its entire microcomputer line, allowing mainframe and minicomputer applications to be executed on Alpha Micro systems. The package is available for approximately \$1,400. Alpha Micro is located at 17332 Von Karman Ave., Irvine, Calif. 92714.

Microdata Corp. has introduced **Realcalc**, an electronic spreadsheet software package that makes available financial planning tools and data base access to users of the company's Reality and Sequel business computer systems.

The package accommodates basic financial analysis in addition to divisional reporting, sales projections, cash flow analysis and "what if" investigation. It is said to offer users access to any element of information from the Reality relational data base system.

The package is priced at \$1,595 from Microdata, 17481 Red Hill Ave., Irvine, Calif. 92714.

Epson America, Inc. has announced version 1.18 of **Valdocs**, an integrated word processing software package for the company's QX-10 personal computer. The new version is said to include underlining, variable line spacing and bargraph shading. This most recent version

(Continued on Page 64)

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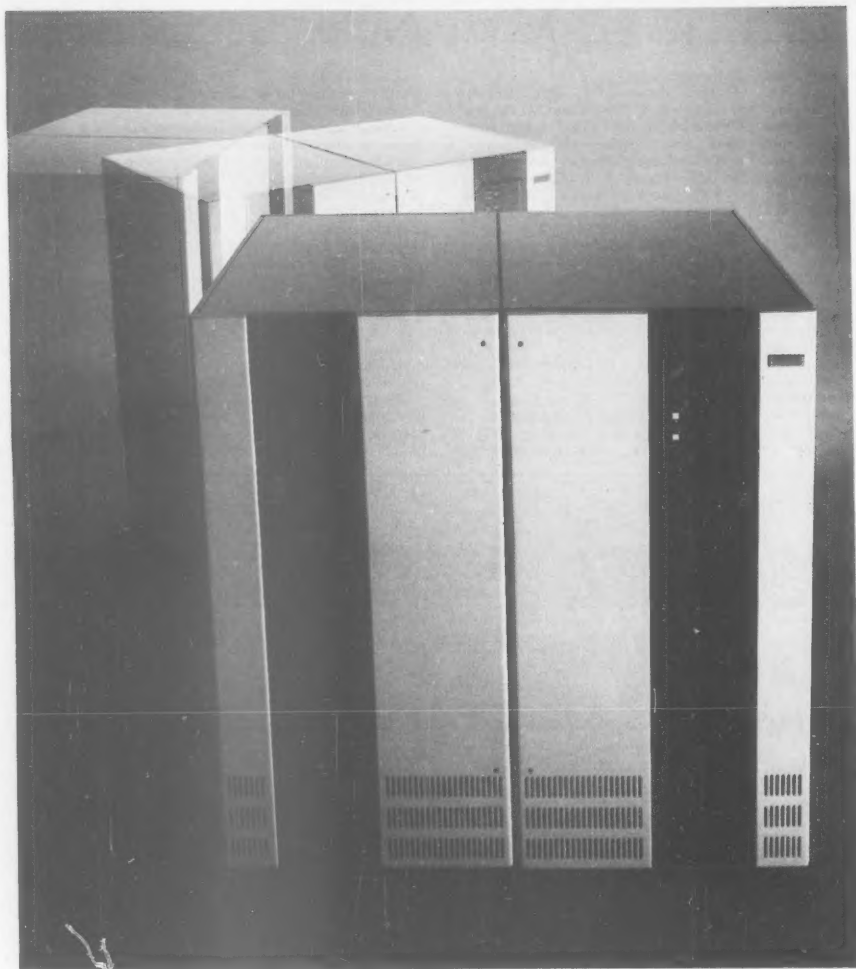
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For more on the Prime 9950, or on the entire Prime family of compatible computers, call **1-800-343-2540** (Mass., 1-800-322-2450), or write Prime Computer, Prime Park, MS 15-60, Natick, MA 01760. In Canada call 416-678-7331. In Europe write, One Lampton Road, Hounslow Center, Hounslow, Middlesex, TW3 1JB, England. In the Far East, write Unit 1005, Tannery Block, 35 Tannery Road, Singapore 1334.

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Micro Notes

(Continued from Page 61)

is said to provide Televideo Systems, Inc. 920 terminal emulation as a setup option and runs any Digital Research, Inc. CP/M software configured for the QX-10. The Valdocs software comes with the QX-10 personal computer, which is priced at \$2,995 from Epson America, 20355 Hawthorne Blvd., Torrance, Calif. 90503.

The Small Computer Company, Inc. has announced the following add-on products for Radio Shack's Profile Plus data base management software:

- **Advanced File Definition with Shuffle** enables information to be edited and rearranged on a screen with few keystrokes. The price is \$200.

- **Transfer** moves programs and data between Radio Shack's TRS-80 computer. The price is \$150 for transfers between computers with the same diskette sizes or \$200 between computers with 5¼- and 8-

in. diskettes.

- **Display** shows what a report will look like on screen before printing and costs \$50.

- **Proform** reduces the time it takes to format a diskette. The price is \$50.

- **Quickback** provides fast diskette backups and costs \$50.

- **Quickback with Format** offers both Proform and Quickback and costs \$75.

Three Small Computer products with math-related features include:

- **Eight-Line Reports with Math** increases the two-line limit on reports to eight lines and defines math formulas, including averaging, for up to five reports. The price is \$150.

- **Math Upgrade for Profile Forms** is an extension to Profile Forms that lets information from records be printed on a page of up to 66 lines or 11 in. by 13 in. The price is \$100.

- **Math 64** increases the usual 16

math formulas per data file to 64 and costs \$150.

The software runs on Radio Shack's TRS-80 Model 2/12. Further information is available from Suite 1200, 230 W. 41st St., New York, N.Y. 10036.

Response, Inc. has announced the following products:

- **PC/Coder** is a utility set of programs operating on the IBM Personal Computer or Personal Computer XT, with two diskette drives, 128K bytes of memory and IBM's PC-DOS operating system. The price is \$450.

- **PC/Banker-CEO Module Update-Farm Finance** is designed to handle the financial records associated with a farm or farm-related business for the IBM Personal Computer with at least 192K bytes of memory and two double-sided, double-density diskette drives or the IBM Personal Computer XT. This application

requires Lotus Development Corp.'s Lotus 1-2-3 access system (included in CEO) and IBM's DOS 1.1 or DOS 2.0 operating system. The price is \$750.

- **General Accounting** is an integrated set of general accounting modules that may be used individually or together with complete interfacing between modules. Modules include accounts receivable, accounts payable, payroll, general ledger and inventory with point of sale. The modules are designed for users of the IBM Personal Computer XT with at least 128K bytes of memory, or the IBM Personal Computer with an expansion unit of 10M bytes or 20M bytes or a Personal Computer with a non-IBM disk compatible with PC-DOS 2.0. The cost per module is \$650 from Response at 608 2nd St., P.O. Box 66, Jackson, Minn. 56143.

BPI Systems has introduced the following products:

- **Accounts Payable System** for Texas Instruments, Inc.'s Professional Computer with two floppy diskette drives or one floppy diskette and a Winchester hard disk drive. The price is \$395. Versions are also available for Apple Computer, Inc.'s Apple II, Commodore Business Machines, Inc.'s 8032 and Digital Equipment Corp.'s Decmate II computers.

- **Church Management System** for IBM's Personal Computer XT with two 320K byte floppy diskette drives or a fixed disk. The price is \$795. Versions are also available for Apple Computer, Inc.'s Apple II Personal Computer with two or three disk drives.

- **Personal Accounting System** for the IBM Personal Computer XT with two 320K-byte diskette drives or an IBM Personal Computer XT. The system allows definition of assets, liabilities, net worth, income and expenses. The price is \$195. Versions are available for Sanyo Business Systems Corp.'s 1000, 2000 and 3000 computers.

- **General Accounting System** for Apple Computer, Inc.'s Apple IIe micro with 64K bytes of random-access memory, two Apple II diskette drives with a controller for DOS 3.3. The system can be used with a single floppy diskette drive and a fixed disk. The system also runs on an Apple II+ personal computer with an 80-col. card. The price is \$395.

- **Business Analyst System** for Apple Computer, Inc.'s Apple II+ with two diskette drives and controller card for DOS 3.3. The price is \$195.

- **Speed Reading System** for Apple Computer, Inc.'s personal computers. The price is \$195.

Additional information is available from BPI Systems at 3423 Guadalupe, Austin, Texas 78705.

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- We can still use all of IBM's new products, like the COAX multiplexer.
- Interestingly MEGA II supports all of IBM's 3278 Models 2 thru 5.
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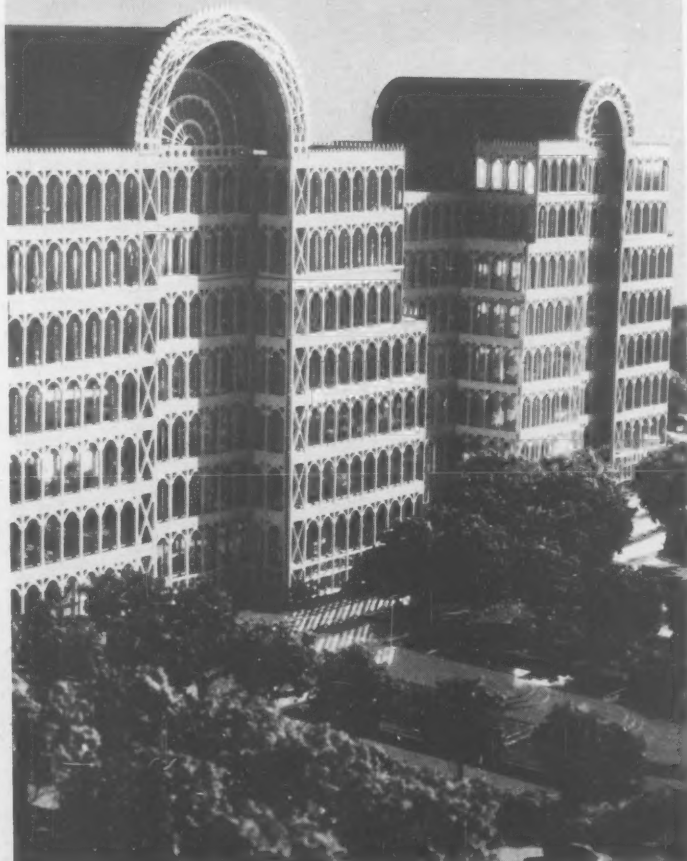
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IN DEPTH

By Matthew Allen

Great Britain hosted the first world's fair, the Exhibition of Industry of All Nations, in 1851. By order of Queen Victoria and Prince Albert, the Great Exhibition was to be the symbol of the emerging Industrial Revolution. The showcase for nearly 14,000 exhibitors' best technology was the Crystal Palace, itself a grand manifestation of England's industry with a touch of fairy tale thrown in.

Designed by horticulturist Joseph Paxton, the Crystal Palace was a stunning achievement combining ironworking with the fanciful use of glass, not dreary Dickensian brick and stone.

Manufactured goods and artwork were displayed throughout 18 acres of floor space from May 1 to Oct. 11 and viewed by some six million people. The American section, thought at the time to be somewhat spare and certainly lacking in display sophistication, nevertheless impressed visitors with its radical new repeating pistol called the Colt revolver, Charles Goodyear's miraculous applications of vulcanized rubber and Cyrus McCormick's efficient grain



Artist's Conception of Boscom Registration Area

reaper. Some press accounts took note then that America was on its way to being a technological force.

Indeed, 130 years later, America will attempt to inherit the legacy of the Crystal Palace with a monument to technology of its own, the Infomart. In fact, in keeping with the historical analogy, its design will be based on Paxton's original drawings.

Announced in September 1981 by Dallas-based developer Trammell Crow Co., Infomart will provide year-round display space in Dallas for makers of computer and telecommunications equipment. Buyers will be brought to them through special horizontal and vertical applications shows. The goal is to shorten buying cycles and save marketing costs in a

complex, competitive business marked by rapid innovation.

This simple yet radical approach to marketing for information processing has already been tested by Trammell Crow for other industries. Only blocks away from Infomart, near the downtown area, Crow's Dallas Market Center operates trade marts for such industries as apparel and home furnishings.

The computermart idea has also attracted others, most notably the developers of the Boscom complex, a renovation of Boston's Commonwealth Pier structure, scheduled to open in mid-1985, about six months after Infomart (see facing page).

The Trammell Crow development, which broke ground May 25, will provide about one million square feet of permanent leasable showroom space plus an underground parking garage and exhibit hall.

The intent is to establish an environment in which buyers can scan a manufacturer's entire line of offerings at their leisure and learn about the newest developments and applications in a "learning center" offering regularly scheduled classes.

The Infomart will not strive to be
(Continued on In Depth/4)

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Boscom 'Selling a Program Concept'

Though at least a dozen other computer trade marts have been announced or rumored in San Francisco, Montreal, Atlanta, Toronto and other cities, Boscom and Infomart are the only ones off the drawing board.

Boscom intends to refurbish the Commonwealth Pier building at a cost of \$165 million. The Commonwealth Pier was constructed in 1914 and was the largest such structure in the world at the time. Howard Miller, Boscom's chief executive officer, describes it as "an 80-story building lying on its side."

Boscom's plan is to gut the structure and transform it into a mart with 1.3 million square feet of space, including 500,000 square feet of leasable showroom space, a 130,000-square-foot exhibition hall and 60,000 square feet of auditorium and meeting space. The opening is scheduled for May 1985.

The project is being backed by FMR Corp., a financial services firm that manages about \$20 billion in various funds and has renovated sev-

eral Boston office buildings. Permanent financing has not yet been procured, but FMR has supplied about \$15 million so far to get construction started, Miller says.

Lease rates have risen from \$22.50 per square foot annually to \$35 since the project was announced in January 1982. About 20% of the 500,000 feet of showroom space is under firm lease for a minimum of three years, with IBM and Xerox Corp. renting the most space at about 28,000 feet apiece. Other smaller tenants to date include Corvus Systems, Inc., Ask Computer Systems, Inc. and Epson America, Inc. Another 20%, Miller says, has been assigned under letters of intent. "I don't think you can ever say you're on schedule [with leasing]," Miller observes, "but with 20% leased at this point, we're pretty much on track."

Like Infomart, Boscom plans to bring a steady stream of homogenous groups before the tenants to cut the length of the selling cycle. So far, the organization has planned nine verti-

cal and horizontal programs with guidance from an education advisory board that includes MIT math professor Seymour Papert, Yankee Group president Howard Anderson and Harvard Business School professor F. Warren McFarlan.

Miller believes Boscom's narrowly focused educational programs will set it apart from Infomart, which also has a line-up of conferences dealing with specific applications and industries. Infomart hopes to capitalize on having industry groups in Dallas for shows at its other nearby trade marts. "They're primarily selling real estate," Miller says. "We're selling a program concept. We're not asking people to drop in just because they're in Boston for another show."

Conference attendees will be shuttled across Boston Harbor from Logan International Airport to Boscom in enclosed water taxis.

Boscom projects one million visitors during the first year of operation. About 60% are expected to come from within a radius of 400 miles,

but "we honestly think we'll have a worldwide audience," Miller says.

Miller intends to break even operationally from day one, relying exclusively on lease revenues to pay all costs. Fees from various training classes that will be offered will be used to expand the curriculum.

A visitor to Boscom will be given a magnetic-strip card encoded with his name and company. He will use the card to activate one of several hundred terminals that will display Boscom's layout, tenant list and program schedules. He can also make appointments with specific tenants via the terminals. When he does visit a showroom, the tenant will run his card through a reader, adding him to a prospective-client data base.

"We're going to try to keep the vendor from having to meet with two doctors, two lawyers and an Indian chief all in one day by bringing in specific groups," Miller says. "That way the tenants will have time to prepare the appropriate systems to best meet those specific needs."

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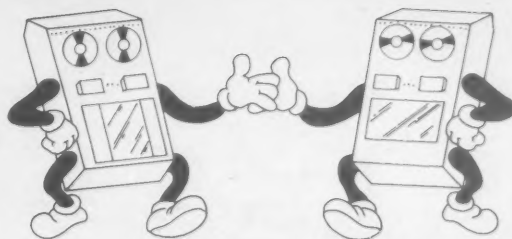
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IN DEPTH

(Continued from In Depth/2)
another distribution channel, but rather, an enhancement of existing ones. Only manufacturers, not distributors, can lease space. Actual sales will be prohibited on

premises. Instead, a centralized data base will provide tenants with profiles of every buyer who walks through the doors for further qualification by the appropriate sales office.

The theoretical benefits are one-stop shopping for buyers and a steady stream of high-quality prospects for vendors. The idea seems simple enough — until you try to explain it to a vendor long

accustomed to attending the standard trade shows and making cold calls.

Infomart President Bill Winsor has had to overcome two major hurdles. Since the development will be the

world's first facility with this kind of high-tech marketing strategy, there is no template for judging the plan's strengths and weaknesses. Basically, Trammell Crow Co., through financing from Citicorp, is plunking down about \$92 million on a highly educated guess that Infomart will work. In addition, the Dallas Market Center is not a familiar name in the

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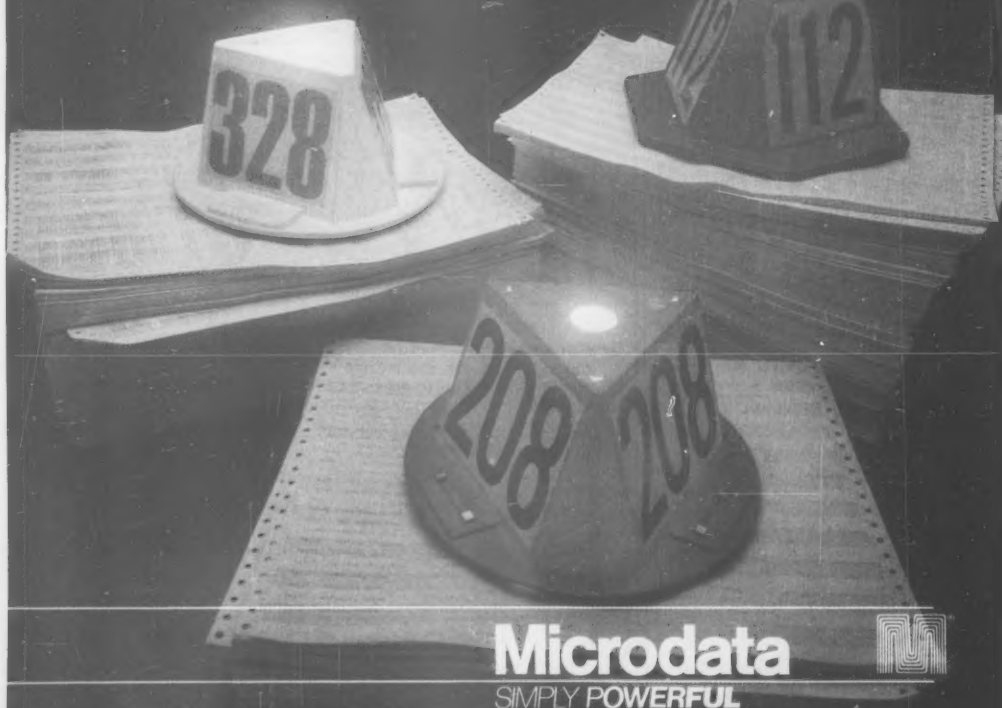
The theoretical benefits are one-stop shopping for buyers and a steady stream of high-quality prospects for vendors.

data processing industry.

Trammell Crow Sr., the patriarch of a group of companies that now has \$6 billion in gross assets and controls more than 133 million square feet of commercial property in 60 U.S. markets, had the glimmer of an idea for such a computer trade mart some 16 years ago during a conversation with H. Ross Perot, founder of the half-billion-dollar Electronic Data Systems Corp. They pondered the idea, and Perot concluded it wouldn't work then because the equipment filled rooms, cost too much and appealed to only a few applications. In addition, the field of possible tenants was small — just IBM and a few others.

But one event changed the thinking of developers — the emergence of the microprocessor in the early 1970s. The computer on a chip has led to stand-alone desktop computing power that encompasses virtually everyone as a potential user. Yet it has touched off cost reductions that threaten the financial stability of dozens of vendors as they struggle to reach the unsophisticated — even unwilling — potential customer. Therein lies Infomart's mission: to cut the cost per lead, reducing pressure on margins.

Three years ago, Trammell S. Crow, the founder's son and chairman of the board of the Dallas Market Center, which operates seven other trade marts, decided to research the idea further to determine if the time was indeed right. He studied a



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IN DEPTH

number of trade shows and conferences, the closest cousins to a computermart. Their biggest shortcoming is the enormous expense of moving personnel and equipment to a temporary location to catch the fleeting attention of a frenzied attendee.

"An 8-foot by 10-foot space at a trade show typically costs \$8 to \$12 per square foot for just a few days," says Bill Wozencraft, president of Canamex Ltd., a Dallas marketing consultancy that has leased Infomart

"An 8-foot by 10-foot space at a trade show typically costs \$8 to \$12 per square foot for just a few days. And trade shows are like shooting up in the air with a shotgun — you just hope you hit something."

space to offer on a time-share basis to small Canadian companies. "And trade shows are like shooting up in

the air with a shotgun — you just hope you hit something."

The decision to forge ahead was

supported by a market research study last year of 12 distribution channels and 100 users with at least 250 employees. Of the respondents, 82% said they would be willing to travel more than 500 miles to a mart. Second, they typically observed it would be "a way to get away from the hassles of being called upon by so many salesmen."

At first, it appeared that Infomart would have competition in its own backyard. The Boston-based real-estate firm of Leggat McCall and Werner, Inc. announced almost simultaneously a 500,000-square-foot facility at Las Colinas, a posh commercial-residential development a few miles

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Infomart President Bill Winsor

west of Dallas. But in August of last year, Leggat realized that two such facilities could not possibly survive in such close proximity.

The location of the Infomart in the midst of the other trade marts and about 6,000 hotel rooms, most built by Crow as well, armed the Infomart with two powerful marketing tools: a well-established infrastructure that would appeal to potential buyers and considerable potential for Infomart to schedule buyers' conferences concurrently with appropriate trade shows at the other marts.

Crow and Leggat briefly considered a joint venture but could not come to terms, leaving Infomart to go it alone in Dallas. As of Oct. 1, 40% of Infomart's space is under firm lease at prices ranging from \$22.50 to \$30 per square foot annually, depending on the amount leased. Another 40% is in final negotiations, including 24,000 feet for Xerox Corp. Recently, AT&T Information Systems signed a lease for 15,000 square feet.

Glaringly conspicuous is the absence of IBM, which has signed up for about 28,000 square feet at Boscom. Winsor is quick to add that Infomart's negotiations with IBM have intensified, and he has reasonable expectations of signing the company on.

One industry analyst observes

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IN DEPTH

that it is critical to have IBM as a tenant, much as it is for a shopping mall to sign Bloomingdale's or Sakowitz as an anchor. Since the Infomart has signed AT&T, the analyst believes IBM won't be far behind.

Fred Fishman, a senior marketing support administrator with IBM's national-accounts division, is involved in the trade-mart negotiations. He explains that when IBM signed its lease with Boscom last November, the company thought "Boscom best met our needs. But it has been a year since then, and we think Infomart has made a lot of progress. Our point of view is different now. We're continuing to look at Infomart and other developments."

Fishman says that IBM's lease with Boscom contains certain preconditions that he has "no doubt" will be met. "We didn't ask for any special guarantees, but we wanted to make sure that as time went on, the quality of the facility wouldn't change."

Asked if the preconditions required certain other companies to participate, Fishman declined to comment.

Xerox was intrigued enough with the concept to lease about 21,000 square feet at Boscom in addition to the letter of intent to lease at Infomart. Franklyn Thiebaud, the newly appointed manager of market-center operations for Xerox, says the challenge for both marts will be to keep a continual parade of buyers going through the doors to make such an ex-

pensive strategy worthwhile.

"It's one thing to bring 50,000 people to the National Computer Conference for a couple of days. It's quite another to provide a steady

flow of qualified users," he says. "On the other hand, we are looking for ways to access qualified incremental prospects."

Infomart's approach to keeping the faucet turned on

is a series of user conferences aimed at both horizontal and vertical markets determined by study of the largest industries most reliant on information processing.

"We investigated the pen-

etration level of computers in 23 industries that are the top [gross national product] producers," Winsor explains. "Farming was at the top of the list in terms of being a virginal market, but we

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IN DEPTH

knew that would be too difficult to sell to. The top six industries in terms of availability of hardware and software were financial, medical, legal, insurance, wholesale distribution and retailing."

And Infomart's schedule of conferences and trade shows, numbering nearly 100 so far, includes six vertical shows aimed at those industries.

Six horizontal conferences

include financial planning, local-area networking, industrial automation and applications of the personal computer to Fortune 1,000 companies. In addition, Infomart is hoping to attract major

trade shows for its exhibition hall, though some of those may become endangered species if the concept works as well as intended.

"There are at least 30 major shows," notes Jerome

Dreyer, president of the Association of Data Processing Service Organizations, Inc. (Adapso) and a member of Infomart's board of directors along with Adm. Bobby Inman, who heads Microelectronics and Computer Technology Corp. in Austin.

"Shows are very expensive to attend, but companies can't afford not to go because their competition could get a leg up on them," says Dreyer. "The main thing the Infomart will have over the trade shows is its educational program. In the long run, it has the potential to cut down the number of shows."

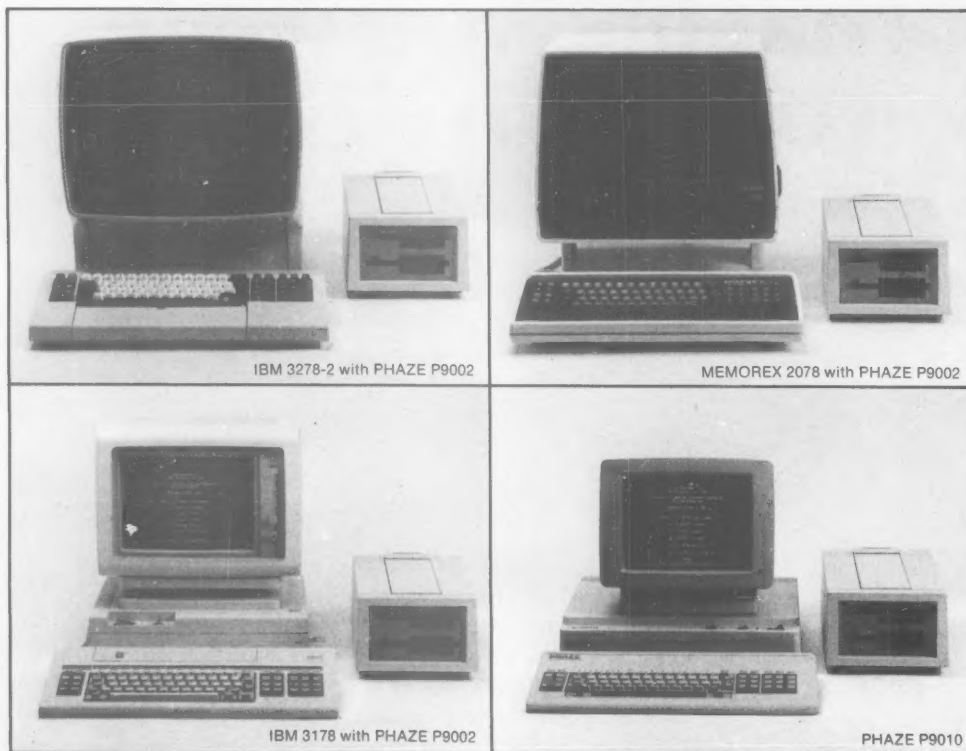
One market researcher adds that the mart concept should prove superior to trade shows because "the business is so complex now with so many products that many facilities aren't big enough anymore to house everything. And users are just coming away from shows more confused than ever. Marts should be able to control that confusion through the thematic nature of their conferences and their less hectic environment."

Xerox's Thiebaud sees trade marts as a way to access the increasing levels of management that are becoming involved in buying decisions. In the old days of mainframes, vendors knew that data processing administrators were the ones to approach for a sales pitch. "But now we're talking about distributed processing, networks that involve several departments and people of varying levels of sophistication in their knowledge of computers," Thiebaud says. "It's much harder now to get a straightforward decision. The buying cycle is much more complex."

These market pressures have changed attitudes among makers about showing their products in close quarters with one another. "Five years ago, a vendor would have said, 'No way am I going to have a showroom next to my competitor,'" one industry observer says. "Now, because of networking and compatibility issues, they realize they had better be next to each other to catch any business."

One might assume that small companies would be the ones to benefit most from an Infomart or Boscom because they could, theoretically, get the most for their

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marketing dollar. But large companies will be able to show off their most sophisticated technologies, such as satellite networking and teleconferencing. And some companies are using Infomart as a base for regional offices or extensions to existing facilities in Dallas.

Infomart expects to derive about 50% of its revenues from leases and the rest from training classes, trade shows and other support services.

A user will pay a set fee to visit the

Infomart. He will register by answering a detailed buyer's profile aimed at determining what his business is, his experience with data processing, what equipment he may have already and what his specific needs are. His name will be recorded on a magnetic-strip card he will carry with him, from which vendors can compile a list of prospect clients who visit them. Then tenants can retrieve full profiles of these visitors from Infomart's registration data base to

qualify further these prospects.

If a visitor wishes, he can make an appointment to see a specific vendor's display.

Registered visitors can then attend a 10-minute video seminar explaining how to use the Infomart, including its Learning Center, which will have courses costing \$45 to \$75 that deal with everything from very generalized concepts to the latest applications in, say, military telecommunications.

A visitor can then walk up to a simple terminal and access the list of tenants that have the equipment in which he is interested. Then he is free to wander the reincarnation of the Crystal Palace.

Infomart's exterior will be composed of a white aluminum framework supporting highly reflective silver glass panes. Because the structure will be far lighter than the original granite design, fewer interior structural supports are needed, providing more meeting-room space. Its modular design will allow it to ex-

Infomart tenants can retrieve full profiles of their visitors from the registration data base to qualify those prospects further.

pand eventually from seven levels to up to 15.

The architects are pondering use of a system of louvers for the semicircular central atrium's skylight. The louvers automatically could track the sun, providing a variety of lighting conditions that can be carefully controlled to result in energy savings. The construction should be quicker than the original design, according to Chris Leyenberger, one of Trammell Crow's architects involved in the project. "That's because the framework will more or less snap together. We're trying to figure out what to do with the skylight in the event that more levels are added."

Construction crews have started pouring the 257 foundation piers that must be more than 100 feet deep to provide enough support in the event the structure does expand to 15 stories.

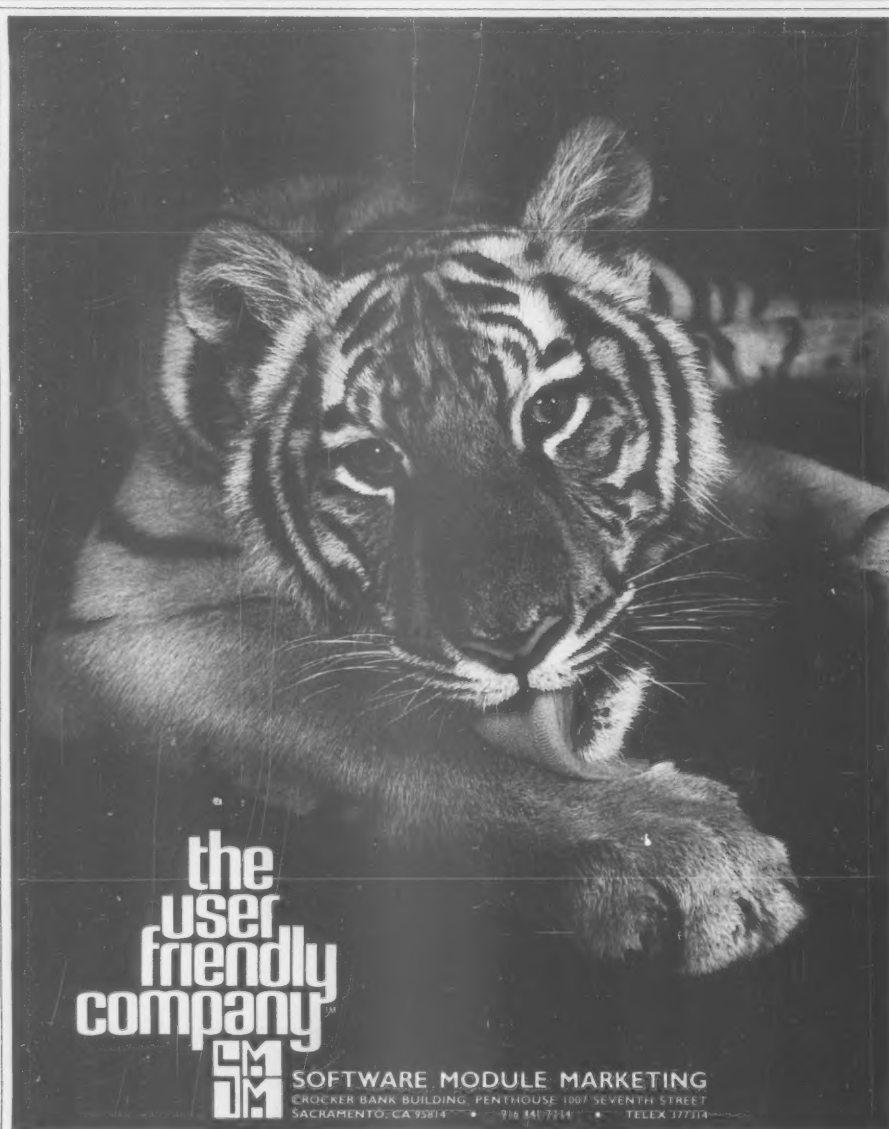
At this early stage, Infomart and Boscom are vigorous rivals. Infomart was announced 3½ months before Boscom and is well under construction. Boscom held its groundbreaking ceremony Sept. 14.

Boscom is quick to point out that it has signed IBM as a tenant, while Infomart has not. And any mention that Infomart has a more central geographic location draws the response that "within a 400-mile radius of Boscom is the world's largest installed base of computers."

But if Franklyn Thiebaud is right, all this competitive posturing isn't necessary. "They are geographically removed enough from one another that they should be able to attract separate audiences. I think ultimately probably four to eight of these trade marts could be supported on a regional basis."

About the Author

Matthew Allen is a Dallas-based freelance writer who specializes in high-technology articles.



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Producing Reports Managers Really Use

By Alexandra J. Rand

Managers typically use less than half of the information they receive from computer-based information systems. Some research suggests the percentage is even lower.

Most managers openly admit they do not understand much of the output they receive. Often, information they claim is unavailable actually exists but is simply not formatted in a useful way. Managers are turning to personal computers and creating rough, but controllable, mini-management information systems rather than taking advantage of the far more powerful and exacting systems that exist to serve them.

Why the apparent rift between managers and their management information systems? The most compelling explanation is that business managers still find most computer-based reports cryptic, confounding

and too time-consuming to use.

These managers are accustomed to receiving the information they need through informal, highly personalized, verbal reports from subordinates and associates. The data provided is typically rough and highly aggregated but easy to understand and directly applicable to pending business decisions.

Most computer-based documents offer excessively long, abstract, tabular arrays of figures with few if any cues to help the manager quickly extract and interpret the information he needs. This mismatch between managers' information expectations and the typical content and format of computer-based reports dramatically undermines the impact of management information systems.

The mission of MIS is to help the organization achieve its business ob-

jectives by contributing to the quality and effectiveness of business decision making. As the MIS function begins to mature, a key challenge facing alert MIS directors will be to develop ways to provide existing information to decision makers in more understandable and value-transparent formats.

What determines if business managers actually use computer-based reports? A type of "net value" formula seems to approximate the test put to MIS documents by managers. The net value of a particular report is determined by estimating the "costs" associated with using the report (time, effort, frustration and so on) and "subtracting" these costs from the potential gain of having the information contained in the report.

This formula provides important clues about the likely behavior of managers when it comes to

IN DEPTH

computer-based reports. Unless the information in a particular report is perceived to be terrifically relevant and needed, its potential usefulness will not win out over any degree of difficulty or discomfort associated with using the report.

The net value concept holds an important lesson for MIS professionals. If your organization's computer-based management reports are like most — lengthy, not especially well-organized or lacking consistent la-

Typically, the final format of documents is predominately a product of machine-like considerations. Ease of data entry and simplicity and efficiency of computation determine the organization and sequence of data.

bels and helpful graphics — odds are they are not being used by your company's decision makers. In fact, the

reports are probably being dismissed as not worth the effort required.

To make a fuller contribution to

the organization, an MIS director's strategy should be to maintain, or preferably increase, the perceived usefulness of each product while substantially reducing the costs (time, effort and frustration) associated with using them.

Let's take a closer look at the criteria that determine the usefulness of computer-based reports.

Standards of Usefulness

Relevance. Are the focus and content of the report directly relevant to decisions that I will be making?

Scope, level of detail and information structure. Does the report encompass the needed range of data, at a level of aggregation to make it most meaningful to me?

Reliability and validity. Where does the information come from? Is the source data verifiable?

Accuracy. Does the data have an acceptable level of variation?

Timeliness. Does the information reflect the most current data?

Because any one of these dimensions can be decisive to a manager's evaluation, MIS directors need to be certain that a particular report measures up against each criterion. Most reports already fare reasonably well on the technical questions of reliability and accuracy. And most organizations have made significant progress in gathering and processing information in a timely way.

Reports typically get into trouble in the most fundamental issues of content and data structure. Commonly, the data is not clustered or structured in a way that makes it immediately meaningful to business managers. Problems in the range of data, the way the data is aggregated and the overall relevance of the information to business decisions reflect critical flaws in the development effort.

These problems may be traced to the well-publicized "cultural gulf" between business managers and technical specialists. Their difference in goals, orientation toward time and basic interpersonal styles may mean that the two parties never quite get together on the specific results they are out to achieve.



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Give them the powerful 9 pound, 16-bit computer that works when and where they do.

Give them an advanced battery-powered printer that attaches securely on the computer.

Give them an interactive human interface and operating environment that takes only 15-30 minutes to learn.

And unique field-oriented software that comes in rugged plug-in capsules.

In short, give them the Gavilan™ mobile computer.

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Never has there been a complete business computer system as sophisticated, yet as lightweight, as the Gavilan.

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The 8 line X 80 character screen eliminates the need for an external monitor, although you can add one if you wish.

The full-size typewriter keyboard makes data entry as convenient as it is in desktop systems.

A built-in 3½" microfloppy disk drive and modem provide the capabilities of data handling and transmission where they never before existed.

And a 50 character per second printer gives the mobile professional in the field the immediacy of hard copy text, forms, charts, spreadsheets and graphics.



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The success of any computer depends in part on the "friendliness" and accessibility of the user interface.

Especially in the field.

A standard mouse interface is fine for the expanse of a desktop, but not for work on the move.

So with the Gavilan, we incorporated a built-in touch panel: the first fully integrated computer mouse.

It's a pressure-sensitive pad just above the keyboard. Finger movements across the touch panel control the on-screen movements of a cursor.

But like a mouse, the Gavilan touch panel actually executes virtually all of the user commands, saving the keyboard for typing only.

Through the touch panel,

users store and retrieve data. Cut and paste. Move documents. Scroll through pages of information. Zoom out for a complete look at the format of a document. Or even ask the computer what just happened and what to do next. With one finger.

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The intuitive ease of talking to the computer through the touch panel is made possible by the unique Gavilan operating environment and software packages.

The applications packages come in durable capsules called CapsuleWare™. They plug directly into the body of the computer, adding no additional volume. The operating software, (GO System™) then lets each of the applications communicate with each other through a common interface and a sharing of data.

The result is a completely integrated information environment that lets the user combine spreadsheets, graphics and word processing text together.

All in the same uninterrupted user mode.

OUTWARD MOBILITY FOR USERS. UPWARD MOBILITY FOR OEMs.

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IN DEPTH

In addition to making certain that a report fully measures up to the five dimensions of usefulness, MIS directors should also consider factors outside of the report itself that can influence a manager's perception of its products' value. Subjective factors that actively shape managers' perceptions include the overall reputation of MIS in the company, top management's stand toward computer-based data and the results of past experiences using reports. If these

If your organization's computer-based management reports are like most — lengthy, not especially well-organized or lacking consistent labels and helpful graphics — odds are they are not being used by your company's decision makers.

factors are all positive, a given manager is much more likely to find greater value in the reports provided.

To increase the perceived usefulness of its products, MIS must continue to improve its standing and reputation within the company, all the while improving the usefulness of its reports.

The standards for determining whether a report is perceived to be easy to use are somewhat more straightforward:

Organization. Can I immediately determine the arrangement of the data and the location of any given piece of information?

Sequencing. Is the data ordered according to its importance, and are numbers that I need to use in combination located together?

Labeling. Are there labels, titles, headings, legends and descriptions to help me understand the information?

Layout. Is the data easy and pleasing to examine?

Graphics. Are there charts and graphs to help me recognize trends and spot variances?

The net value concept suggests that these dimensions, which traditionally have been treated as cosmetic by some data professionals, contribute mightily to whether a report is actually used. In fact, most reports fail simply because the costs associ-

Problems in the range of data, the way the data is aggregated and the overall relevance of the information to business decisions reflect critical flaws in the development effort.

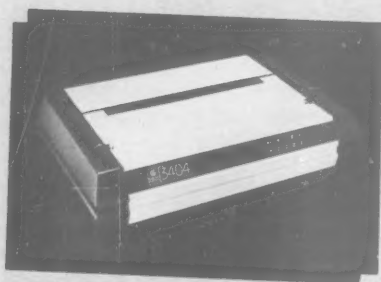
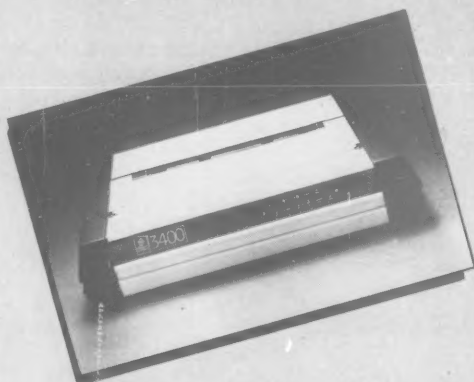
ed with using them — the time, effort and a sense of incompetence — outweigh the potential gains the manager believes the information might offer.

There are a number of reasons that computer-based reports rarely measure up against the standards of usability. Typically, the final format of documents is predominately a product of machine-like considerations. Ease of data entry and simplicity and efficiency of computation determine the organization and sequence of data.

The need for extensive labeling and the addition of charts and graphs to lend meaning to disparate numbers are often lost to technical specialists, whose primary orientation is simply capturing the required data. And finally, few programmers or systems analysts are trained in how to best lay out data for maximum readability and ease of comprehension.

The most usable report is one that is completely "transparent." An experienced business manager should be able to pick up a report and understand the data it includes without

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Together, we can find the answers.

Honeywell

IN DEPTH

any special training or explanation. A number of strategies have been demonstrated to increase that transparency.

Shortening reports by eliminating overflow detail or by having the extra data

available in an optional appendix is almost always appropriate, because excessive length immediately hurts usefulness. Adding a data summary page and a detailed table of contents greatly

helps most reports. Ordering data according to its relative importance and, further, sequencing according to how managers actually use the data are very important.

Adding a simple flow-

chart to show the data components and their relationships can help guide the manager through the report. A consistent labeling system, ideally one that also depicts the structure of the data, is

essential. Finally, including charts and graphs greatly improves the ease and speed of using the report. Pie charts and bar graphs can immediately reveal trends and highlight variances important to business decision making.

Rating Your Reports

In order to improve the net value of your reports, start by determining how

Adding a simple flowchart to show the data components and their relationships can help guide the manager through the report. A consistent labeling system, ideally one that also depicts the structure of the data, is essential.

they currently measure up. That means determining in considerable detail how reports are currently perceived by managers. A special survey instrument, called the Report-Rater, has been developed to measure swiftly and accurately the perceived usefulness of any type of computer-based report. This survey can be administered either in pencil-and-paper format or on-line.

One-on-one interviews with a representative sample of managers is another successful technique for determining how your reports are perceived. These discussions need to be carefully structured around key questions of usefulness if they are to provide the highly specific data needed to make tangible improvements.

Management information systems can make a far greater contribution to organizations if MIS professionals work aggressively to improve the net value of their products. To ensure that the data you gather, process, print and distribute genuinely enhances business decision making, increase the perceived usefulness of your reports and decrease the perceived costs associated with using them.

About the Author

Alexandra Rand is a principal of Internal & External Communication, a Santa Monica, Calif.-based consulting firm dedicated to helping corporations improve their management information documents.

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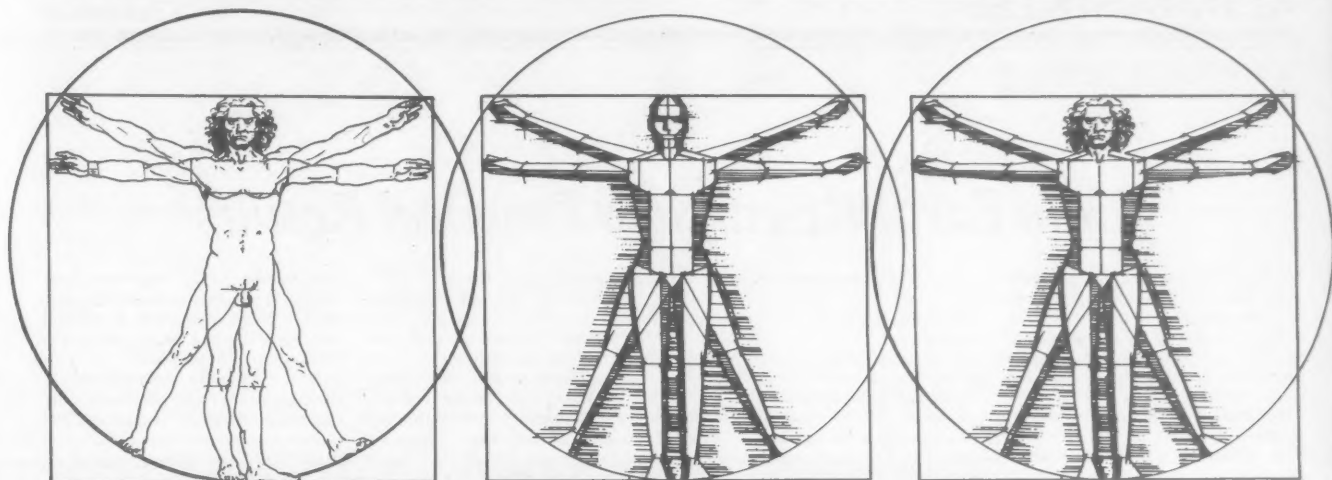
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Artificial Intelligence And the Business Manager

By David B. Hertz

Once it was the small business proprietor who possessed virtually all the facts about his operation. The larger the enterprise, the longer the data took to get to the top. But information systems have turned the curve of availability upside down.

The dilemma is that the Fortune 1000 executive may have too much data too soon. His problem lies in turning it into usable information.

Artificial intelligence (AI) may promise one resolution of the executive's dilemma. Knowledge resides in the facts; mining that knowledge for more effective competition, smoother operations and better planning is a major goal of AI knowledge scientists and engineers. They believe the right kind of computer programs will turn the tide of data from an uncontrollable flood to an orderly, productive stream.

Digital Equipment Corp., for example, uses an expert system for configuring its VAX systems. Orders for DEC systems come to the company salesmen in a wide variety of requirements. The task of configuring a system to meet the individual company's

order requires bits and pieces of knowledge residing in heads, data files or manuals throughout the manufacturing and assembly operation.

DEC's Expert System Configurator (Xcon) lets salesmen deal directly with the configuration at the customer level, connecting them directly with the technical editors' knowledge.

Before Xcon was developed, technical editors in the manufacturing departments reviewed all orders for correctness and order completeness. Mistakes in parts or components could make the entire system inoperable after testing; it might not meet desired requirements at the customer's site.

Through Xcon, the technical editors themselves gain access to a knowledge base that was constructed by mining the knowledge of the best configuration experts and putting it into an intelligent computer program.

Expert systems such as Xcon are written in rule-based languages. These languages are oriented toward symbolic manipulation: The programmer can code directly the terms of the problem (for example, the various

components of a configuration and customer requirements) in English. Xcon was written in OPS-5, which has the advantage of language generality. It is relatively easy in OPS-5 to tailor the design of an expert system.

Expert systems are defined as computer programs that perform specialized, professional tasks at a level equivalent to that of human experts. Xcon was designed to be a configuration "expert." They are also called, in AI jargon, "knowledge-based" systems, "intelligent computer assistants" or "expert advisers."

What happens in such rule-based systems? A set of rules, such as: "If a customer requirement calls for data communications, then the configuration must include a communications card (an action statement). If a communications card is used, then a modem must be used." There are more than 2,000 such rules that permit Xcon to produce a customer-tailored configuration.

If-then statements form patterns that can be matched by the descriptions in memory, resulting in a set of

(Continued on In Depth/22)

IN DEPTH

From Early Research to Practical Results

AI has been a topic of scientific study for more than a quarter century. Its originators believed that the growing power of computer memories and calculating ability could be turned to deal with the language symbols and representations people use in thinking and problem solving. Its ambitions were vast and, as in any new field, its actual accomplishments modest. However, as information about the power of computers and their ability to manipulate symbolic representations of the world has increased, practical results have now become a reality.

The research scientists who pioneered in this field had the goal of developing computational models of perceiving and thinking about some parts of the real world that would approximate human beings in similar situations. More recently, the more pragmatic and engineering-oriented goal of designing computer programs to solve problems normally requiring human intelligence and expertise has come to the fore — without regard to whether the programs duplicate human mental processes.

The process of understanding how to design and build an artificial intelligence machine started with the concept that the mind was an enormously efficient digital computational apparatus. Attempts were made to analyze neural processes as though the brain were a network of digital devices similar to a computer.

Today it is generally agreed that the brain does not operate this way. Advances in a number of fields began to provide suggestions, first as to how the mind might work, but much more important, how some aspects of the mind might be imitated by smart machines.

In the early 1950s, predictions were made that machines would soon be able to duplicate the thinking processes of the brain. For example, there was to be a "universal language translator," which would permit the rapid — and semantically correct — translation of written material (or perhaps even speech) from any one language to another. Most of such predictions have still not been realized. But since the work began, some have come up to or surpassed their authors' fondest guesses. A belated but clear example is the progress made in chess-playing programs.

At least some progress has been made in each of the following areas:

1. Mechanical translation of languages.
2. Game playing — chess, checkers, backgammon and so on.
3. Proving theorems in mathematics.
4. Symbolic manipulation of mathematical expressions.

5. Visual reading of written material.

6. Visual recognition of pictures and forms.

7. Hearing and understanding spoken language.

8. Speaking machines.

9. Learning from outside stimuli

to change programs.

10. Creating natural language texts.

11. Creating analogies from one area of knowledge to another.

Taken together, the successes in each of these areas provide a clearer picture of what is meant by the "in-

telligent machine." The computer can go beyond the solution of algorithms to deal with heuristics and thus come closer to being an executive's intelligent helper.

It is intuitively apparent that a computerized robot painting machine that "visually" recognizes dif-

The Suit and Chip proudly debut their baby.

"To look at it, would you guess it has the power of an IBM mainframe?"

The Suit beckoned us closer. "For the VM/CMS users, and there are some 600,000 of them concentrated in big business, financial institutions and government, this little baby means new life for their existing programs and applications."



Future Directions for AI Research

ferent parts as they come down the assembly line, adjusts its painting program accordingly, follows the parts properly, signals when a misplaced or incorrect part comes into view and generally performs "intelligently" is doing something more than storing, adding, multiplying

and dividing numbers. By the 1970s, such machines had begun to be programmable in the newly developed list-processing languages, of which Lisp was the most important and the one universally used today.

These languages permitted the machine to point to numbers of sym-

bols. For example, one whole set of such symbols (the names of all customers for a given product, for example) could be substituted in place of the name of that product in a list of products in another list, permitting the development of knowledge-based systems that could engage in

"sensible" dialogue with an inquiring manager.

Among such knowledge-based systems were Dendral, which could infer possible molecular structures from an input of mass spectrograms; various chess playing programs, such as the current machine champion, Belle; medical diagnosis programs, such as Internist II, Caduceus and Mycin; mineral exploration programs; various computer-aided instruction programs; and computer-aided architectural and engineering design programs.

Smart computer programs generally fall into two categories.

The first includes those that imitate human physical faculties; the machine does ordinary human tasks, ranging from simple to complex. For example, the automatic telephone voice tells callers they "have reached a nonworking number."

The second category may include some of the ordinary tasks but will also have broader objectives that require the working out of complicated combinations of inputs to provide "expert" physical or informational responses (chess playing, spotting incorrect or misplaced parts, making medical diagnoses or working out data from core samples in mineral exploration).

The key to these latter capabilities is that a programmable computer, of whatever size, is itself a model of an intelligent machine. Aside from limitations of memory and considerations of program efficiency (Lisp is not an efficient programming language because it demands large amounts of memory storage and processing time), all standard digital computers are formally the same and can imitate at various levels any other machine.

Artificial intelligence is in itself a formal system of rules that manipulate symbols in a computer's memory based upon the input symbols it receives. It follows, then, that any computer of appropriate size and with arrangements for handling various input modules can be programmed to be an intelligent device, to either imitate human physical activity or to help managers attack problems and issues with expert analysis.

A particular computer hardware configuration, by virtue of its cascading programs from the high-level language the executive may use on his personal computer down to the binary machine code, is the equivalent of any number of machines. (By "cascading" we mean that a symbol in one program can call on another entire program within the device.) Of course, manufacturers design cascades to make machines cheaper to build and easier to operate by virtue of the chosen program languages.

(Continued on In Depth/22)

A 'personal mainframe' no less.

The Chip chimed in. "It is a personal mainframe that provides greater productivity for the individual user, enhances the performance of existing applications, leverages a company's investment in IBM systems and software, and provides access to sophisticated, modern computing environments such as FOCUS™ and RAMIS II™"

—and all at a price affordable by the single user.

We were talking with the Suit and the Chip at their new headquarters in Trumbull, Connecticut. They founded Canaan Computer Corporation in 1981. Prior to that, the Suit, Bob Bernard, was the founder of National CSS, a leader in the development of commercial time-sharing. The Chip, Nick Pisarro, was a major technical contributor there. We asked what makes the Canaan Computer stand out of the teeming mass of new computers.

CMS user freed at last.

"It's simple," explained the Suit. "Recent developments like multi-window graphics and Ethernet™ are giving some buyers of new computers vastly increased capabilities. But as far as the IBM mainframe user has been concerned, these new powers don't exist. The CMS user has had to be satisfied with decade-old technology. With the introduction of the Canaan Computer, that CMS user can now have it all."

Multi-window graphics, dedicated interactivity.

"What we have done," said the Chip, "is develop a machine that provides these state-of-the-art capabilities, and runs the user's IBM mainframe programs with no changes required. So, for the very first time, CMS users, or even non-users who want to take advantage of all that IBM software, can have very high-resolution graphics, networking for shared resources, super interactivity, more computing power than they can ever get on a shared centralized computer—and all in a package the size of a two-drawer file cabinet."

Multi-window graphics, local area networking, a dedicated processor for each user: is there anything else you want the business community to know, we asked?

"Yes," said the Suit. "Our address. So they can write or call for more information. Or to order a machine—they're ready for delivery now. It's Canaan Computer Corporation, 39 Lindeman Drive, Trumbull, Connecticut 06611 (203) 374-5592. Ask for the Suit."



CANAAN



IN DEPTH

(Continued from In Depth/19)

actions appropriate to the rule or rules being interpreted (or matched). Actions will modify the working memory, which is keeping track of the status of the developing configuration. Different subsets of rules are satisfied on each cycle as the machine tackles, one by one, the customer requirements. There is no ordering of the rule memory; all rules are evaluated on every cycle. When more than one rule is satisfied on a

cycle, the interpreter uses a set of conflict-resolution strategies to decide which rule to apply.

All of DEC's VAX family system orders are configured by the Xcon AI system. DEC has described the following benefits as a result of having accurate and fast configurations:

1. An increased order throughput rate.
2. Reduction in costs and delay attributable to errors (that were inevitable previously).

3. Better use of materials, since the system readily accepted constraints on component availability.

4. Better use of personnel, through redeployment of the highly skilled senior technicians to the most difficult tasks not suitable for Xcon.

5. Fast reduction of component requirements data to effective purchasing and manufacturing information.

Expert systems combine the knowledge of experts in whatever

field is involved (business, medicine, engineering) with AI methods for the programming of reasoning. The power of an expert system does not come from the power of the rule-matching or inference programs (the "inference engine," in AI jargon) but from the knowledge-based rules.

A production system program for inferences from the knowledge base takes the if-then rules and produces the "action" recommendations the program finds appropriate. Putting together the knowledge base and constructing the rules is a slow process, but AI researchers are speeding it up with new programming tricks. The 2,000 rules in Xcon match most of the current U.S. experience, but the Japanese are proposing to build systems with 20,000 rules by 1990 in the Institute for New Generation Computer Technology (Icct) project.

In *The Fifth Generation* (Addison-Wesley), Edward Feigenbaum and Pamela McCorduck point out that the Japanese are embracing expert systems research enthusiastically. Fujitsu, Hitachi and Nippon Electric are among the companies taking part. Crisis management systems, involving critical decisions that must be made quickly, are a high priority among the areas being tackled by these companies. One Japanese firm, according to Feigenbaum and McCorduck, estimates a worldwide market of 10,000 systems just for handling electric power network crises.

AI has been chosen as the theme of the U.S. pavilion at the 1985 World Exposition in Tsukuba, Japan. More than 20 million people are expected to visit this world's fair. American industry will be exhibiting AI-related developments and innovations in 30,000 of the 60,000 square feet of the U.S. exhibition building.

AI systems are increasingly being applied to diagnosing equipment

WHAT THE HECK IS AN EXECUTIVE WORKSTATION?

A lot of people have the wrong idea of how you should use a personal computer. And fancy phrases like "executive workstation" only hide the benefits of personal computing under a cloud of tech-babble.

The fact is, instant information and a computer on every desktop don't always mean bigger profits and more efficient workers. Because when "non-computer people" use personal computers in business, the *software* they use is always more important than the hardware that's used with it.

But sometimes this software's just too hard to use, or can't do the job. Or it's already out-of-date. All of which confuses the same people it should be helping. We'd like to clear up some of that confusion.

THE CONTEXT MBA: IT TURNS EXECUTIVE WORKSTATIONS INTO "EXECUTIVE THINK-STATIONS."

The Context MBA is software that lets you use the personal computer as a creative tool for better business decisions.

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Store, edit, sort, or modify this information on your personal computer and use the MBA's electronic spreadsheet to create a "model" of your business.

Develop plans and forecasts in a fraction of the time it would take to do them by hand, or by using a single-function software package.

While using the MBA's spreadsheet function, you can instantly graph and chart vital figures on the same screen. So, as you make cost or revenue assumptions, you can see immediately how the result would affect your business - this year, and five years from now.

And when you've made your decision, use the MBA's executive report writer to put words, numbers, and graphs together in a clean, printed report.

It doesn't take a computer to tell you that this kind of control over business facts, figures, and alternatives gives you an edge on the competition and a head start on each new day.

SEE IT NOW.

The Context MBA can be used on the IBM Personal Computer, the IBM PC-XT, and the Hewlett-Packard Series 200 personal computers.

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If you have an IBM PC, we'll also be glad to send you a free copy of our Context MBA Sampler Disk that gives you a live demo of the MBA.

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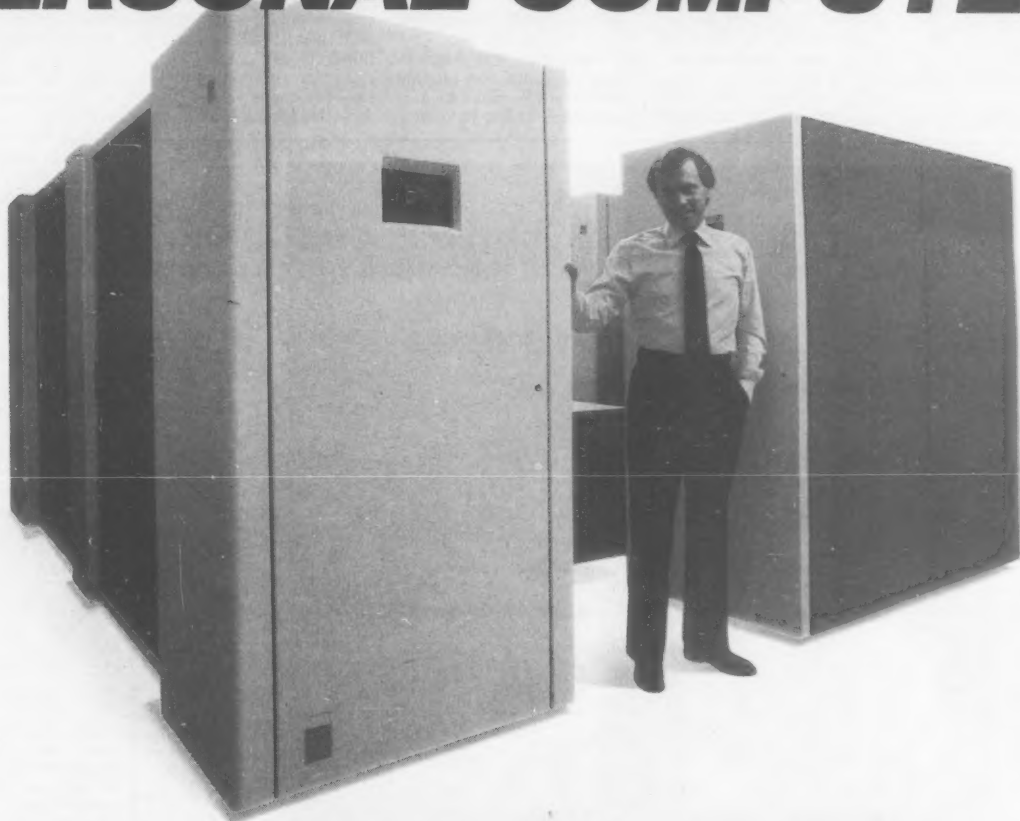
New Directions For AI Research

(Continued from In Depth/21)

As memories have become cheaper and as Lisp-like languages and programs that permit more complex cascading become increasingly efficient, the intelligent machine is available for top management functions. Applications lie in planning, marketing, production and distribution, not only for robotization, but also for inventory, production and sales control; in sharpening up the marketing function; and in designing business unit and overall competitive and product strategies.

Personal computers available to integrate these functional and top management decision structures now have large and inexpensive memory spaces. The enhancement of intelligence by decision support systems will soon be a necessity to match the sharpness of the competitor who is there already.

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problems. General Electric Co. has developed a computer-aided troubleshooting system, Cats-1, for electric locomotives, a major GE product line.

The system was developed

by GE's Knowledge-Based Systems Group and was designed for routine operations on the shop floor, embodying the knowledge of many of its experts. Cats-1 has about 550 rules now and will

ultimately contain more than 1,500 to handle locomotive repair shop problems.

The system will diagnose those problems and provide specific action plans to deal with them. This type of sys-

tem is expected to become widespread for assembly line and manufacturing operations.

Expert systems provide not only diagnosis and plans for taking action, but also

clear-cut explanations of the reasons the computer program is proposing them. For this reason, GE is also using Cats-1 as a training tool — as an "explanation tool" — not merely to supply computer output directions for taking the steps necessary to repair a locomotive.

AI is also being applied to programming itself. It is likely that computerized programming "assistants" will become a major area for expert program development.

At a recent European conference on software, researchers reported on an intelligent data management system to overcome the problems of limited memories in minicomputers and microcomputers that ordinarily require complicated overlaying techniques and common data blocks.

With an intelligent program such as this one developed and implemented on Wang Laboratories, Inc. hardware by E. Backx and J.P. Rammant of Catholic University in Leuven, Belgium, programmers can rapidly handle complex problems. Written in Basic, the "smart" system uses a structured data access method that stores all input arrays on an external hard disk. The system keeps track of input, editing and additions. Pointers and names replace the usual dimensioned matrices. Virtual pages are allocated dynamically in the various program modules without intervention, storing results in the pages for easy postprocessing.

A program has even been developed to find the rules an expert (or novice) is using to make decisions even if he isn't quite sure why he is making them. Called a "rule-inducing program," developed by Dr. Donald Michie at Scotland's Edinburgh University, it is neat and compact, written in Pascal and formatted to run directly on the IBM Personal Computer or Apple Computer, Inc. Apple II. It permits the user to enter sets of sentences (logical or numerical), each containing observed or chosen values for a set of specific attributes. The entries may be either logical or integer values.

The expert enters his decisions for each combination of attributes and values. If the decisions are made by a reasonable set of rules, whether the expert knows them explicitly or not, the



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system will analyze the examples and produce rules that fit. It will automatically deal with redundancies and provide rules that contain only the dominant attributes, taking into account inconsistencies among the examples.

For instance, an inspector in a manufacturing test program where a certain number of tests are performed (and either passed or failed) may decide what faults are implied in the patterns of the tests passed or failed. He may not know his set of logical rules for his decisions. The program will find the rules for him from the pattern inherent in the examples it is given. As many as 20 attributes (here, tests) and any sensible number of examples may be used.

Recently, Joel D. Goldhar, dean of the School of Business Administration, Illinois Institute of Technology, called the "factory of the future" a cross between a chemical process plant and a computer system in which the output peripherals are machine tools and robots rather than printers and terminals. Effective use of new AI and robotization technology requires new organization structures, marketing and management styles, exploring rapid design changes, variety and alternative distribution systems.

James Albus of the National Bureau of Standards, has outlined an "automatic factory" concept: eight-level robot control architecture that is used to tie together dynamic interactions between control, sensory processing, modeling and planning. This network architecture addresses the interface and communication issues in an automated machine shop.

In the 1980s, such systems will give business, institutional and government executives continuing analyses for tactical and strategic decisions, developed in the context of a management-decision-support network.

The executives and their managers will use friendly, intelligent computer systems programmed to provide ongoing review of performance against plan and of alternative courses of action in their areas of responsibility. Along with these simulations for varying time intervals (from one day — for a production schedule for a special order, for example — to many years for a capital spending plan), such systems will communicate general and specific instructions to appropriate managers to implement the chosen alternatives or change previous plans.

Organizationally separate plans can be consolidated into sets of coordinated and consistent overall options. The proposed plans, along with their benefits and risks, will be presented to the appropriate executive (at whatever level) through his personal computer — the "chief of staff," so to speak, of managerial computers that tie into his.

This process will be available to managers at all levels, operating on

Proposed plans, along with their benefits and risks, will be presented to the appropriate executive (at whatever level) through his personal computer — the "chief of staff," so to speak, of managerial computers that tie into his.

the information and alternatives provided from subordinate and coordinate data bases, plus instructions

from above. The top executive can proceed with his planning knowing that once a plan is decided, opera-

tions should go forward in accordance with previously determined and programmed policies (just as a military commander assumes that each unit under his command will act according to previously established tactical doctrines).

Not Infallible

Decision-oriented software programs can make mistakes just as humans do. Therefore, the decision systems for any organization must be

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designed to operate in tandem with human beings, who must be provided with key data and mechanisms for taking control if, in their judgment, the computer is making a significant error.

With this command, control and communications network of personal computers, the executive can question managers individually or in groups, as well as obtain additional data from staff departments or from outside agencies. His own input, sug-

As AI moves to commercial and industrial applications, the scientific and medical applications of recent years will seem like child's play.

gestions and decisions during the planning and implementation stages may be communicated to appropriate individuals. This input will provide continuing control of the plan devel-

opment, preventing it from going off track as so often happens when planners are isolated from the decision makers and implementers. And, of course, the same decision support

system becomes an implementation support system, monitoring accomplishment against plan.

Flexible system network architectures allow the information flow to adapt to real organizations and the needs of their people instead of making the organization conform to the system's structure. The networks can connect and use the many informal peer relationships that often bypass the authority structure. They permit a wide scope of managerial control, varying from central direction of information flows to loosely coupled arrangements.

No single approach will fit all organizations. But different application structures can coexist and may be effective within the same basic planning structure.

Given the enormous (and growing) capacity of chips and memories, increasing transactional speeds and easy interconnectability, computers in a network can perform tasks that are light-years beyond today's usual applications. But it will be up to users and applications developers to lead the way: Executives and DP managers will, in effect, have to be the systems architects. As AI moves to commercial and industrial applications, the scientific and medical applications of recent years will seem like child's play.

But there is no dearth of organizations willing to take on the challenge. Companies like Teknowledge, Inc. of Palo Alto, Calif. (formed in 1981), Cognitive Systems, Inc. in New Haven (1982) and newly formed Syntelligence, Inc. in Menlo Park, Calif. have been started by AI scientists to take advantage of corporate America's growing awareness of the possibilities inherent in intelligent computer systems. Peter Hart, president of Syntelligence, hopes to be among the first to apply AI to "hard," nontechnical business applications, primarily for insurance and financial institutions. A recent list of companies in the field included 20.

DEC, Symbolics, Inc. and Xerox Corp. are among the manufacturers with plans to enhance their present symbolic and relational processing computers, and all plan to offer new and more readily programmable machines in 1984 for the AI community.

About the Author

David Hertz is a distinguished professor in the School of Business of the University of Miami in Coral Gables, Fla. He serves as director of the university's Intelligent Computer Systems Research Institute.

He was formerly a director in the New York office of McKinsey & Co., Inc. for 20 years. Prior to joining McKinsey, he directed operations research at Arthur Andersen & Co.

Hertz is the author of *Artificial Intelligence and the Executive Mind*, scheduled for publication this year by John Wiley & Sons.

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THE IDLE, INDISPENSABLE MICRO

Even if a manager turns to his personal computer for only 30 minutes a day, increased productivity can justify costs.

By William F. Zachmann

The remarkable success of personal computers over the past year or two caught many industry participants by surprise. Various attempts to assess the dimensions and implications of the phenomenon have given rise to quite contradictory views.

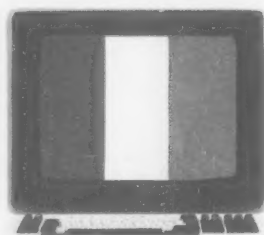
On the one hand, some would have us believe that the ongoing wave of personal computers sold through computer stores will radically change everything from the way major operational systems are built in large organizations to the equipment and software distribution patterns of the information industry. Extreme proponents of this view go so far as to proclaim the mainframe computer effectively "dead" and see manufacturer direct sales dwindling away in favor of computer store channels of distribution.

Others, however, have more recently begun to question whether the recent popularity of personal computers amounts to much more than a fad, a kind of expensive "Hula Hoop" craze. Proponents of this view claim that personal computers really aren't very useful, remain idle most of the time, will not significantly affect the way operational systems are built in large organizations and will soon fade into the background as their relatively insignificant value, compared with their costs, is recognized.

While a personal computer may not be helpful to everyone, there is little question that the vast majority of managers and professionals can be significantly aided by a personal computer in doing their jobs better and more productively. Those who claim otherwise do not have a very good grasp of the real capabilities of a personal computer appropriately configured with adequate software.

Spreadsheet software such as Visicorp's Visicalc, Microsoft, Inc.'s Multiplan or Lotus Development Corp.'s 1-2-3 is relatively easy to learn and use. Anybody who needs to prepare a budget or a profit plan will find the task much

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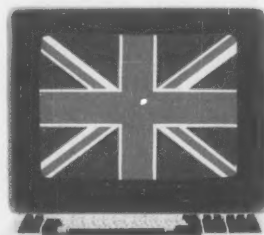
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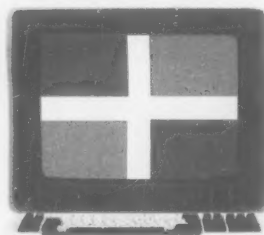
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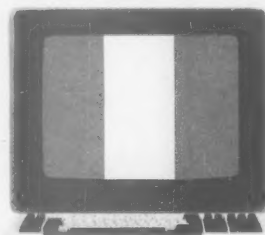
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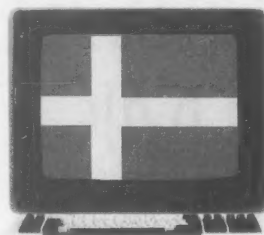
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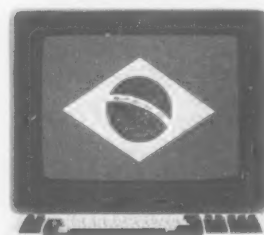
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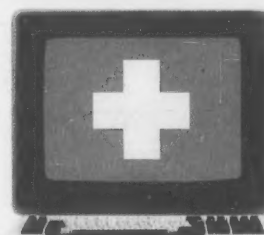
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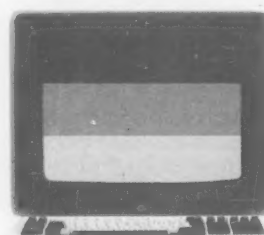
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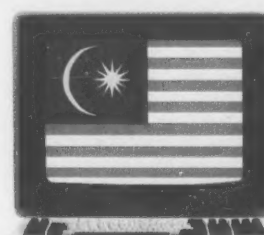
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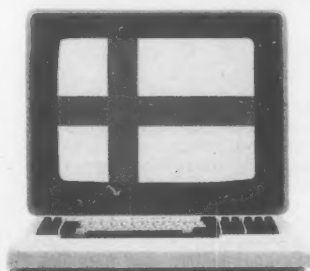


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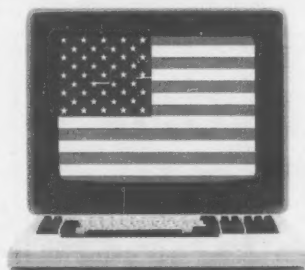
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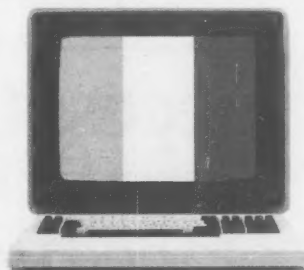
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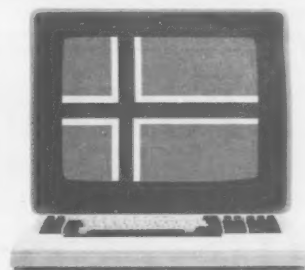
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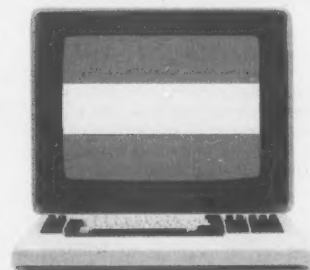
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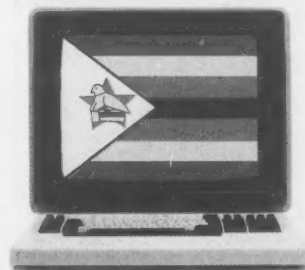
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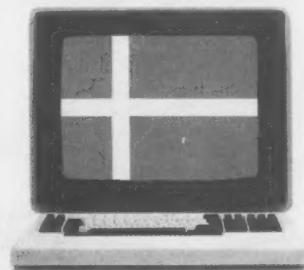
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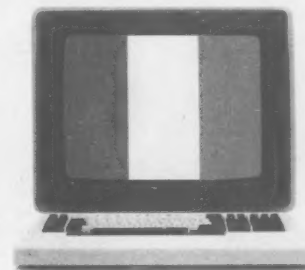
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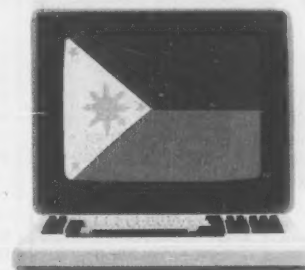
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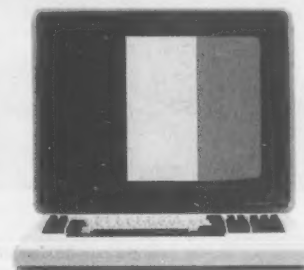
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IN DEPTH

easier with a personal computer and spreadsheet software.

A second major use of personal computers is for word processing. Newer software like Multimate offers word processing capabilities for personal computers comparable in functionality to dedicated word processors. The number of personal computers used for word processing now exceeds the number of dedicated word processing terminals installed. Users include many manag-

ers and professionals.

Data base management systems, as well as small business accounting, graphics, scientific and engineering applications and a growing number of specialty applications are readily available for personal computers. These provide useful and productive tools, mastery of which is well within the grasp of capable individuals who are not, however, computer specialists.

Finally, the ability of a personal

computer, with appropriate interface cards and software, to emulate nearly any terminal device permits the user to gain telecommunications capabilities with a personal computer at modest incremental costs.

Only a Beginning

The current generation of software has already made the personal computer a very useful tool. Yet it is only the beginning. The amount of talent and resources directed toward

software development for personal computers has expanded enormously over the past year or two. This effort is beginning to result in the growing availability of more and more powerful software, including general "tools" packages as well as vertical applications software.

The most widely used data base management, graphics, word processing, spreadsheet and other packages of a year or two ago are already under siege by more capable competitors offering packages with more features, greater ease of use and lower prices. The extremely competitive environment for software ensures a continued leapfrogging of capabilities with successive product introductions.

Some of the most important product introductions over the next few years are likely to be for new types of software products for personal computers. Artificial intelligence, expert systems and adaptive systems research will provide the foundation for developing software that will be both more capable and easier to use than the present generation.

A major arguing point of the recent wave of debunkers of personal computers is the indisputable fact that a typical personal computer in a corporate environment is used by its owner only a small proportion of the time. From this fact, the conclusion is derived that corporations are wasting an enormous amount of resources through the use of personal computers.

The relevant issue is not whether the personal computer is used 24 hours a day, but what it does to improve productivity. The expense impact of a personal computer is small compared with the burdened expense of managers and professionals today. For example, if the personal computer, used an hour a day, allows someone to accomplish what might have taken a whole day without it, then there can be little question of wasted resources.

With large mainframe systems costing millions of dollars, the virtues of getting as much use out of them as possible are obvious. In a typical large installation, one attempts to keep the data center supplied with just enough capacity to do the job, and relatively high usage rates are desirable.

The applicability of that type of resource management to personal computers is by no means obvious, however. A manager or professional will often not use his desk or telephone more than a portion of the time. That does not constitute a valid reason for not giving him a desk and telephone or for having him share a desk or telephone.

The only relevant question is whether the personal computer helps its user to be sufficiently more productive, thereby justifying its cost. There is no question that in a very great many cases, the answer is clearly "yes." And not only can the

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micro provide a much quicker route to a result, but it gives the user a means of doing some things that he simply could not do manually.

Despite the clear utility of personal computers in business and professional applications, they will not obsolete large mainframe systems or radically change the way major operational systems are designed and developed. They will open some significant new opportunities and as a consequence make the development of large systems a bit more complex. But these will be evolutionary rather than revolutionary developments.

For the most part, personal computers will function as their name implies — as personal tools. As an extension of this function, a major requirement will be for access to data that is maintained as part of operational systems. Hardware and software to support such access will be of considerable importance.

All of that, however, will have only incidental impact on the basic nature of the operational systems themselves. In other words, the use of personal computers as personal tools will be in addition to, rather than instead of traditional operational systems.

There are two primary areas in which personal computers will open new opportunities in developing large operational systems:

1. Use of personal computers already installed to give managers and professionals planned access to newly developed or updated operational systems.
2. Employment of the local intelligence capabilities of personal computers in distributed applications.

As the number of personal computers continues to grow, new operational systems will be designed to accommodate valid access to data. Along with this, tie-ins to generalized software tools in personal computers as well as specialized software for them to support operational system links will be developed. These will not require that major operational systems be fundamentally altered but will imply explicitly building in "hooks" for micro access.

In a somewhat more limited set of operational systems of the future, personal computers will be more completely designed into the system. In cases of this type, the basic system design will make use of the personal computer capabilities and substantial resident software will be developed as part of the operational system. Over the next few years, however, this development will be much more likely to displace minicomputers or small business computers that might otherwise have been similarly employed than it will be to directly diminish the role of the mainframe.

Just as it is very much premature to proclaim the death of the mainframe, it is also premature to proclaim the ascendancy of the retail store that specializes in selling computers as the runaway winner for

personal computer distribution. There is no question that computer retail stores are here to stay and that they have profoundly altered the way "computers" are sold. But there are also good reasons for thinking that the total share of market (in dollars as well as in units) for specialty retail stores in the distribution of personal computers is topping out and will tend to decline somewhat over the next few years.

First, there is absolutely no ques-

tion that the high unit volumes of relatively inexpensive systems have moved out of computer specialty stores and into consumer goods mass merchandise stores. These include department stores like Macy's, discount chains like Lechmere Sales, high-fidelity audio dealers, camera stores and even drug stores and hardware stores. This development is not entirely confined to the extreme low-end systems either. A considerable number of these outlets are

carrying systems with average prices in the \$3,000 to \$5,000 range.

In addition, while a significant number of large user organizations do deal with computer retail specialty stores (especially the larger chains), that pattern may change significantly. Vendors' renewed direct sales aggressiveness in large accounts and users' interest in obtaining maximum discounts create a situation ripe for more direct sales.

Finally, growing involvement of

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IN DEPTH

traditional office equipment dealers in computer equipment sales as well as aggressive mail-order dealers will also eat into the distribution shares moving through retail computer stores. As smaller users become more sophisticated, the larger discounts available through mail-order channels become increasingly attractive. And as better third-party (for small users) or in-house (for large users) service alternatives become available, willingness to pay what

amounts to a price premium to "full-service" retail computer stores will diminish.

Supply-Limited Market

To a considerable extent, the market for personal computers and components actively in demand is supply-limited at the present time. Best-selling models like the IBM Personal Computer still require a wait for certain models (such as the XT) or features (such as the IBM color moni-

tor) in many areas. Popular second-source accessories like expansion boards and add-on disks are just ramping up to broad production and availability.

There is a bit of a glut-or-famine phenomenon at present. Unpopular models sit at uncomfortable inventory levels collecting dust while customers sign up on waiting lists for more popular equipment. This situation presently operates in favor of the larger retail specialty chains like

Computerland and Sears, who have the clout with manufacturers to obtain the desired goods.

Within the next six to 12 months, however, the supply-to-demand ratio of the more popular systems and accessories is likely to come more into balance. Wider availability of the most popular systems combined with the need to move stagnant inventories of less popular models will inevitably lead to price cutting.

One of the most remarkable phenomena in recent months has been the dizzying fall in the prices of the extreme low-end systems (accompanied, in many cases, by equally dizzying drops in earnings expectations and stock prices for the vendors involved). Atari Corp., Texas Instruments, Inc., Commodore Business Machines, Inc., Sinclair/Time, Coleco and even (though to a lesser degree) Tandy Corp. and Apple Computer, Inc. have participated in what might be thought of as a very aggressive price war for low-end systems.

For the reasons stated above, that war will spread, over the next year, upward to the middle-range personal computer systems currently with average system prices of \$2,500 to \$7,500 or so. The earnings pain that has been felt by vendors in the low-end market will quite soon be shared by vendors in the middle range as well.

New Generation of Systems

Another element in the competitive environment over the next year or so will be the growing availability of more capable systems. To some degree this will involve more Motorola 68000-based systems running Unix/Xenix. AT&T's almost certain entry with systems of its own early in 1984 will also be a factor.

The most important developments will come, however, with a growing flood of new systems (including some from IBM, or should we say "iBM") that will be based on the newer Intel Corp. parts: the 188/186 and the 286. These will sufficiently raise system capability, rendering the current generation of machines effectively obsolete, at least at present price levels. In addition, by mid-1984 or so we should also be seeing portables using Cmos implementations of the 8086 architecture (with the 80C86 from Harris).

Users will continue to see more capability for lower prices. But these changes will also add to the misery of those vendors who have been unable to gain sufficient airspeed to leave the ground before the end of the runway.

About the Author

William Zachmann is vice-president, technology assessment, at International Data Corp., an information industry market and technology research firm headquartered in Framingham, Mass.

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System Eliminates Terminal Cables By Using AC Wiring Already in Place

The following article originally appeared in Computerworld Japan. It was provided to Computerworld by the CW International News Network.

TOKYO — Computer users entrenched in a mesh of computer terminal wiring might find a solution to their problem in a system recently introduced here that relies on electrical wiring.

It now appears possible to connect a computer and terminals without the trouble of installing dedicated wiring. With the use of an electrical wiring system, which is already in place in private residences and office buildings here, a computer can be connected to terminals.

"As long as there is a . . . power source, connecting a computer and terminals with existing electrical wiring can be accomplished," claimed a spokesman from Fuji System Resources Co. Ltd., developer of the concept.

Although the connections are confined to function within the same transformer system, within one building, for example, the obvious advantage is that no new wiring is necessary, and the terminals can be scattered in a variety of places around the building so long as there is a wall plug socket handy, Fuji explained.

Computers are usually connected with their terminals through electrical wiring, telephone wiring, ultra-short wave and so on. The Fuji product is said to establish the connection through the ordinary electric wiring already in place.

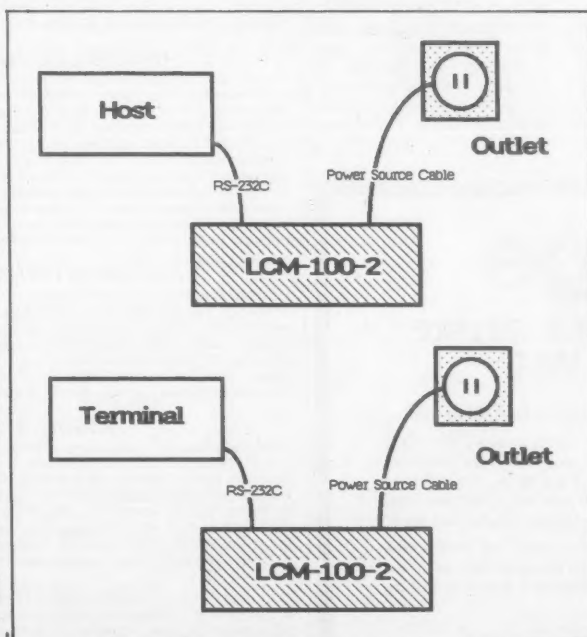
As outlined in the adjacent figure, the connection is completed by simply inserting the plug into

the wall plug socket through a modem (LCM-100, manufactured by Communications Research, Inc. of the U.S.). Since the interface used is the standard RS-232C, the new product can be used immediately, as long as the computer system is equipped with the RS-232C.

One modem is necessary on the data communication side, on the computer, for example, and another on the terminal side, so that a pair of modems must be employed. One pair of modems enables both sending and receiving of data.

The modem contains two communications terminals, one for the electrical wiring and the other for the RS-232C, and carries out the transfer of the frequency shift key (FSK) data. The FSK signals pass through the electrical wiring and then can be picked up from any of the ac wall plug sockets within a building.

The communicable distance is about 196 ft.; however, the distance can be further extended (Continued on Page 68)



Example Application of the Un-Cable Modem LCM-100

DEC Offers Products To Enhance Ethernet

MAYNARD, Mass. — Communications hardware and software said to increase the capabilities of Xerox Corp.'s Ethernet local-area network have been released by Digital Equipment Corp. The products are said to enable DEC's LSI-11 microcomputers, PDP-11 mini-computers and VAX-11 super-minicomputers to communicate under Phase IV Decnet.

The new offerings include an interface to connect DEC's line of Q-Bus microcomputers, three Ethernet communications servers, a remote fiber-optic repeater, software packages to support the hardware and an enhanced version of its Observer network monitoring software.

The Decnet communications controller links LSI-11 and PDP-11 microcomputers using the Q-Bus architecture to Ethernet, providing network designers with low-cost system nodes to Phase IV implementations. It operates at 10M bit/sec to as many as 1,023 devices on the Ethernet cable, a DEC spokesman said.

Available in early 1984, the controller will cost \$1,150.

Communications servers that link DEC's Phase IV Ethernet implementations to other networks, including Ansi X.25 packet-switched and IBM Systems Network Architecture, also increase the resources available to the nodes on a network, DEC claimed.

The Decnet router server will link Phase IV implementations with other Phase IV and Phase III Decnet networks. The gateways and routers will be available in 1984 for between \$17,000 and \$26,995.

(Continued on Page 68)

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From Avanti LDX-100 Converts PBX

NEWPORT, R.I. — Avanti Communications Corp. has announced the LDX-100 local data transmission unit for use in conjunction with private branch exchange (PBX) systems.

The LDX-100 is said to convert existing PBXs to pro-

vide voice and data communications capabilities, allowing personal computers, word processors and asynchronous or intelligent terminals to communicate with each other or with a CPU over existing telephone wiring.

The company said that by utilizing the switching and contention capability of a PBX in conjunction with the LDX-100, the user can implement a combined voice and data switched local-area network.

The unit can be connected either via single line or via multiline key systems using standard modular plugs. The LDX-100 is either synchronous or asynchronous, full or half duplex, and it operates at up to 9,600 bit/sec. Because the same PBX ports are used for voice and data, there is no additional PBX capacity consumed with the system.

The system can be purchased as a desktop unit for placement under a telephone or as a rack-mount module for computer room use. It is priced at \$849.

Further information is available from Avanti Communications at Aquidneck Industrial Park, Newport, R.I. 02840.

Graphics Display Terminal Supports Business Users

TOKYO — The Japan Computer Corp. has announced the NJC-M1000, a graphics display terminal for business graphics, graphics information retrieval, computer-aided design and manufacturing or computer-aided education applications.

The NJC-M1000 comes in a package featuring a non-glare green screen (an amber screen is optional), separate step-sculptured, low-profile keyboard and optional tilt-and-swivel pedestal.

Other features include a 12-in. high-resolution CRT with a 640- by 486-dot resolution, three communications ports, emulation for Tektronix, Inc. 4010 and 4014 terminals and an optional Digital Equipment Corp. VT100 emulator.

The NJC-M1000 costs \$1,995. More information is available from Japan Computer at the Naito Building, Nihonbashi, Hamacho 2-25-1, Chuo-ku, Tokyo 103, Japan.

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Net Management System Announced

MONTGOMERYVILLE, Pa. — An integrated network analysis and management system was announced recently by the Network Control Division of Digilog, Inc.

Called Nams, the system is said to provide alarm notification, centralized diagnostic control and critical path control of every element in a data communications network.

A central management controller reportedly provides the central site control system of Nams and will support up to 16 color CRT terminals. Data base storage with

information on all the elements in the network is stored on 40M bytes of hard disk, with an additional 10.6M removable disk for historical statistics, software updates and data base information backup, according to a spokesman for the vendor.

A network access switch offers fast test access and switching functions for RS-232C, V.25 and four-wire analog circuits, the vendor spokesman said.

Prices start at about \$68,000 from Digilog, 1370 Welsh Road, Montgomeryville, Pa. 18936.

Tools Upgrade Ethernet

(Continued from Page 65)

A repeater to allow Ethernet configurations of up to 1,000 meters through a fiber-optic link was also introduced. The remote repeater can be used in harsh environments and is said to be immune to electrical and electronic noise. It can also be used to configure a single, connected local-area network in two buildings.

The repeater is scheduled for shipment in the spring of 1984 and will cost \$4,400.

Phase IV Decnet software products for the line of PDP-11 Unibus and Q-Bus computers is said to provide large network and Ethernet support for DEC's minicomputers and microcomputers. New versions of the RSX-11M, RSX-11S and RSX-

11M-Plus operating systems have Phase IV support and will also operate on Phase II networks, it was announced.

Both Deqna and Deuna, a communications controller DEC released earlier, are supported by the operating system versions and will support more than 1,000 nodes of network communications. A new version of the Observer network monitoring system running on RSX-11M and RSX-11M-Plus is said to allow a network manager to monitor the performance of Phase IV and Phase III networks.

The software prices range from \$1,500 to \$4,000. More information is available from DEC, Maynard, Mass. 01754.

System Boasts Communications For Micros

IRVING, Texas — Envax Systems, Inc. has announced the Communication Co-Processor, which the company said will provide communications for personal computers by relieving the communications function from the personal computer.

According to the company, the product allows access to Direct Distance Dialing, Teletypewriter exchange service, Telex and other networks and can send mailgrams. The product is designed for use with the IBM Personal Computer, the Xerox Corp. 820 system and the Texas Instruments, Inc. personal computer. Software for systems from Wang Laboratories, Inc. and Digital Equipment Corp. systems is also available.

The system is said to allow personal computers to transmit messages from disk to the Envax system for transmission, and messages received can be archived on disk. It allows files and messages to be listed on the display, printer or remote terminal, a vendor spokesman said.

The standard unit has 16K bytes of memory and internal modems for the required network and is priced starting at \$1,395. Information is available from Envax Systems, 3330 Stovall, Irving, Texas 75061.

System Utilizes Existing Wire

(Continued from Page 65)

depending on individual circumstances, Fuji said. In a certain case, a distance of 787 ft. is actually covered for a 9,600 bit/sec setup.

The maximum communication speed is 9,600 bit/sec, Fuji explained. Furthermore, it is not necessary to match the bit/sec rates of the transmitting side and the receiving side. Thus, the system can respond to a much wider range of communication speeds when compared to the conventionally employed modems.

Also, due to the utilization of two frequency bands of the electrical wiring, it is possible to transmit and receive the data simultaneously.

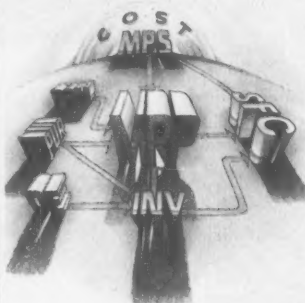
When there are noise intrusions in the electrical wiring — especially when a copying machine is hooked up to the wiring system — an eraser can be inserted to eliminate the noise. A copying machine or other source of noise is first connected to the eraser, which is then plugged to the power source wall socket.

The price of one pair of the Modem LCM-100s is \$1,192, and the erasers are priced at \$193 a piece. With the LCM-100, four modems will be necessary both on the terminal side and on the computer side if four terminals are to be connected.

A new modem, LCM-400, is scheduled to be introduced by the end of October to enable connection of four terminals by setting one modem on the computer side. It will be cheaper and more convenient for users to employ the LCM-400 when a number of terminals must be connected to a computer, the vendor added.

Fuji System Resources is based in Shinbashi, Tokyo.

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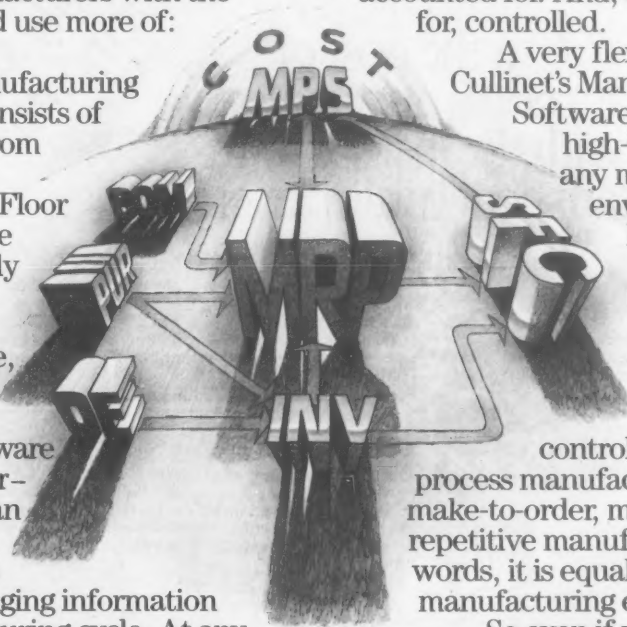
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Cullinet

Seven Modems, Control System Unveiled

Paradyne Announces Release of 10 Products

LARGO, Fla. — Paradyne Corp. has introduced 10 new products: seven modems, a network management control system, a multiplexer and a packet switching system.

The modems include an MP-14.4 modem with an integral microprocessor-based statistical multiplexer, said to be capable of multiplexing up to 16 channels and sup-

porting aggregate data rates of up to 28.8K bit/sec; the MPX series of 2,400, 4,800 and 9,600 bit/sec diagnostic signal-processing modems; the Analysis 5500 series network management control system; and the Challenger 2,400, 4,800 and 9,600 signal-processing modems.

The DCX-T1 time-division multiplexer was also announced. The multiplexer is

said to be capable of combining input from 48 devices into one location and transmitting over a single T-1 carrier.

The PDN5200 packet switching system is said to be based on virtual circuit architecture and features implementation of the ITT Consultative Committee packet.

The MPX 2,400 is priced at \$950, the MPX 4,800 at \$2,000

and the MPX 9,600 at \$3,400. Prices for the network management products start at \$20,000 and vary according to specific configurations. The packet switching system ranges from under \$100,000 to over \$1 million with expansions.

Information is available from Paradyne through Box 1347, 8550 Ulmerton Road, Largo, Fla. 33540.

Modem, Mux Introduced By Rixon

SILVER SPRING, Md. — Rixon, Inc. has announced the R14.4 multiplexing modem and the DCX817 statistical multiplexer.

The R14.4 was designed to operate at 14.4K bit/sec over four-wire private lines. Applications include basic single-port and point-to-point multiplexing, the vendor said.

The vendor said the R14.4 can increase throughput because of a quadrature amplitude modulation scheme which assures performance on channels with a wide range of amplitude and delay characteristics. Forward error correction and a continuously adaptive amplitude and delay equalizer assure overall performance.

The R14.4 costs \$9,950. The point-to-point version costs \$8,950 and is field upgradable to a multiplexing modem, the vendor said.

The firm also announced the DCX817 statistical multiplexer. The unit offers two-channel binary synchronous support, which is statistically multiplexed with asynchronous channels. The DCX817 adds support for the Hewlett-Packard Co. HP 3000 protocol and provides for in-band/out-of-band conversion of flow control as well as a local echo capability.

The price of the DCX817 is \$1,600. Additional information is available from Rixon, which is located at 2120 Industrial Pkwy., Silver Spring, Md. 20904.

Modem Fits DEC VT100s

HALESITE, N.Y. — The Remark Datacom Division of Telebyte Technology, Inc. has announced the availability of its Model 72D, a short-haul modem designed to be used with the Digital Equipment Corp. series of VT100 CRT terminals.

The modems are said to allow the VT100-type terminals to operate at up to 19.2K bit/sec while being located as much as one mile from the computer.

Full-duplex bit/sec operation is accomplished using two twisted pins, one pair for each direction, up to two miles. As the transmission speed is decreased, the distance is extended out to a maximum of 10 miles at 1,200 bit/sec.

The Model 72D is priced at \$130 from the Remark Datacom Division of Telebyte Technology, 148 New York Ave., Halesite, New York 11743.

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Cable Mux Fits 3270s

MANSFIELD, Mass. — Codex Corp. has announced a cable multiplexer for use with IBM 3270 display systems.

The cable multiplexer reportedly supports up to 32 Type-A IBM terminals and printers over a single coaxial cable to an IBM 3274 controller. In a point-to-point configuration, the multiplexer reportedly combines data from a 3274 controller via a single coaxial cable.

Terminals can reportedly be placed up to 2,952 feet from the cable multiplexer unit and linked to another unit located up to an additional 4,920 feet away.

Priced at \$1,100 for a stand-alone unit and \$3,350 for the 32-port unit, the multiplexer is available from Codex at 20 Cabot Blvd., Mansfield, Mass. 02048.

Codex Offers Unit Series

MANSFIELD, Mass. — Codex Corp. has announced its 8500 series data service units designed for operation with the AT&T Dataphone Digital Service Network.

The 8500 series is reportedly designed for use with both point-to-point and multipoint operating environments. Both models feature diagnostics, including various loop-backs as standard test modes.

For network testing and fault isolation, each unit reportedly includes a built-in test pattern generator. For high-speed communications, the Codex 8556 operates at a synchronous rate of 56K bit/sec, according to a vendor spokesman.

Priced at \$725 for the 8500B and \$810 for the 8556 high-speed unit, the products are available from Codex at 20 Cabot Blvd., Mansfield, Mass. 02048.



IBM Modems Out for Large Net Users

RYE BROOK, N.Y. — A rack-mounted modem and multimodem enclosure designed for large telecommunications networks were announced recently by IBM.

The IBM 3868 rack-mounted modem used with the IBM 3866 enclosure is said to make it possible to house up to 72 modems in a standard 19-in. cabinet. Extended diagnostics for more precise

problem determination is featured in the modem, according to IBM.

Communications speeds for the four modems of the 3868 are:

- Model 1 — 2,400 bit/sec over point-to-point or multipoint, nonswitched lines. Its price is \$2,550.

- Model 2 — 4,800 bit/sec over point-to-point, nonswitched lines. It carries a

\$3,340 price tag.

- Model 3 — 9,600 bit/sec over point-to-point, nonswitched lines. Its price is \$5,000.

- Model 4 — 9,600 bit/sec over multipoint, nonswitched lines. Its price is \$5,000.

The 3866 enclosure is available with power and cooling facilities.

It also features up to 12

modem pack slots.

The enclosure is available for \$485 for the Model 1 and \$1,020 for the Model 2.

First customer shipments will be in the second quarter of 1984, according to an IBM spokesman.

More information is available from the vendor's Information Systems Group at 900 King St., Rye Brook, N.Y. 10573.

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Display Terminal Compatible With IBM System/34, 36, 38

GAITHERSBURG, Md. — Printer Systems Corp. (PSC) has announced the 4051 display terminal, compatible with IBM System/34, 36 and 38.

The 4051 has a nonglare screen that tilts 30 degrees up and 15 degrees down for viewing while standing or sitting. It is said to have a 55% lower power consumption than the IBM 5251 display station.

Because less heat is generated, the need for a cooling fan in the terminal is eliminated, the vendor said.

The terminal features an automatic dimming feature, which allows the screen to dim if the keyboard is not used for about 10 minutes.

Additional features include block or underline cursor style, a keyboard that can operate either with an audible click or silently and an N-key rollover that allows the operator to type at maximum speed.

The terminal costs \$1,995 from Printer Systems Corp., P.O. Box 6020, Gaithersburg, Md. 20877.

For 56K Bit/Sec Users

Firm Unveils Data Security Unit

SAN DIEGO — M/A-Com Linkabit, Inc. has announced the LC76CF, a data security unit for users of 56K bit/sec circuits.

The LC76CF uses the National Bureau of Standards Data Encryption Standard (DES) to protect data transmitted over synchronous communications links. The equipment works with data rates from 1.2K to 100K bit/sec. By using the DES in a 1-bit cypher feedback mode,

the LC76CF gives the user a transparent cryptographic device that is also self-synchronizing. The unit operates independently of data format and character set used, the vendor said.

The LC76CF was designed to operate in fault-tolerant networking situations. The unit fits into a standard 19-in. rack and occupies 7 in. of vertical space. The unit is available in three configurations: single channel, dual-

channel per chassis and redundant with automatic fail-over on detection of a fault condition, the vendor said.

The single-channel configuration costs \$8,900; the dual-channel and redundant configurations cost \$15,800. Quantity discounts are available.

M/A-Com Linkabit is located at 3033 Science Park Road, San Diego, Calif. 92121.

Password System Debuts

SANTA CLARA, Calif. — Ven-Tel, Inc. has announced the 212 Security Plus system to provide password security from the modem.

The system is said to provide two levels of password security, one for the operator and another for the supervisor. No calls are permitted without one of the passwords. The operator password permits the user to see only the name assigned to the nine destinations stored in the modem's battery backed-up memory. The supervisory password is needed for users to examine, modify or delete any of the telephone numbers, passwords, account numbers or other information stored in the modem.

The modem is said to provide an integral activity timer which resets the modem after five minutes of inactivity. The system is priced at \$675, and information may be obtained from Ven-Tel at 2342 Walsh Ave., Santa Clara, Calif. 95051.

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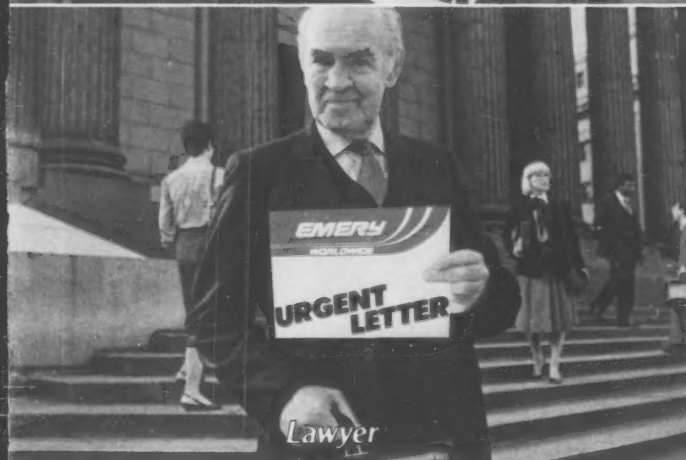
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Transmission System Bows

WESTBURY, N.Y. — Math Associates, Inc., a manufacturer of fiber-optic transmission systems, has announced an eight-channel fiber-optic system designed to transmit contact closures and low-speed digital data in an industrial environment.

Using a single fiber-optic cable between the transmitters, the transmission system

— called the XC/RC-1000 — transmits eight channels, which may be mixed by the user over distances of 3,000 or more meters, the vendor said.

Digital speeds of 4,800 bit/sec per channel, or .5A per contact closure (fully isolated) may be accommodated by the system. Operation power is 7 Vdc to 28 Vdc or

6.3 Vac to 18 Vac.

LED indicators show the status of each channel, the vendor said.

The transmission system costs \$990 per transmitter/receiver pair. More information is available from Math Associates' Fiberlink Division, which is located at 2220 Shames Drive, Westbury, N.Y. 11590.

Transaction Concentrator From Noakes Introduced

IRVING, Texas — Noakes Data Communications, Inc. has announced the Transaction Concentrator System, which is said to be a multi-channel protocol converter and data collector.

According to the company, the system allows a wide range of serial communication equipment to interface with one or more central hosts. It can handle code con-

version, line interface and controls and is said to reduce input and output overhead for the host computer.

The system microprocessor, when connected to the host computer, can interface with up to eight line processor/adaptors, and each line adaptor may have its own protocol conversion that can handle four serial data lines.

The company said the system has host interface, three serial channels, real-time clock and floppy disk interface and is priced from \$6,295. Further information is available from Noakes Data Communications, 3330 Stovall, Irving, Texas 75061.

GDC Announces Four Additions To Product Line

DANBURY, Conn. — General Datacomm Industries, Inc. (GDC) has announced the following additions to its product line:

- The GSU-500A Data Service Unit offers direct connect capability to managers whose system utilizes telephone company-provided Dataphone Digital Service (DDS), without requiring an external channel service unit (CSU).

Network control is accomplished with an optional Diagnostic Receiver Card, according to a spokesman. With this option, the GSU-500A will respond to addressable diagnostic commands from a GDC NDC-20 Network Controller or a GDC Netcon Network Management System Controller. It will cost approximately \$995.

- The Datacomm 500A/56K Data Service Unit was designed to enable it to be used as a direct connect device with its own internal CSU circuitry or for connection to the DDS network through a telephone company-provided CSU. The price is \$1,050.

- The Datacomm 9600EP high-speed modem features 9,600 bit/sec operation, fallback rates of 4,800 and 7,200 bit/sec and CCITT compatibility for domestic and international applications. It costs approximately \$2,640.

- The Gen/Net 1261 is a data concentrator designed to multiplex four or eight asynchronous terminals over a single communications link. The approximate price for four channels is \$1,330 and for eight channels, \$2,090.

Additional information is available from General Datacomm Industries, which is located at One Kennedy Ave., Danbury, Conn. 06810.

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Small Businesses: Is Low Price Of Micros Worth It In Long Term?

By James D. Lewis
Special to CW

In the small business market, microcomputers have only one advantage over minis. That advantage, of course, is price. It is a short-term advantage that often translates into a long-term disadvantage for both user and vendor.

Unlike the home or personal computer market (where once the computer is purchased, the user does not know what applications it can be used for to justify the cost), in the business computer market the user has a multitude of applications for the computer. In fact, it appears that no matter how big the computer system, the uses will totally eclipse the computer's resources.

Everything that the small business manager does is very integrated. His deci-

sions are based on the total pictures rather than on separate entities of the business. Even the decision to purchase a computer system is not based on what it can do without regard to how the economy is treating the business, what the customers of the business will think and how the staff will fit the computer system.

Most small business purchases are totally controlled by upper management and are usually made to process information. Because upper management tends to see beyond the mere processing of information to what the information can do to enrich the business decisions, and because of the integration mentioned above, one- or two-function micro systems have definite disadvantages compared with the mini.

(Continued on Page 76)

National Semi Unwraps 32-Bit Monolithic Microprocessor

NEW YORK — National Semiconductor Corp. recently unveiled here what it claims is the industry's first 32-bit monolithic microprocessor.

Designed to manipulate large data bases, the NS32032 has a 32-bit architecture both internally and externally. The chip is expected to be used in engineering workstations, business and professional computers, integrated office systems, computer-aided design and manufacturing systems and intelligent terminals.

Because it shares the same in-

ternal architecture, the NS32032 is both hardware- and software-compatible with the other two chips in the vendor's NS16000 series, the NS08032 and NS16032.

Like other members of the NS16000 family, the NS32032 was made using Xmos technology. National Semi claimed a potential for operating frequency in excess of 10 MHz.

The chip is packaged in the 68-pin, Jedec B ceramic leadless chip carrier. This package occupies approximately 1 sq in. of board space, about 65% of the area required by an equivalent dual-in-line package, a spokesman said.

In quantities of 100 or more, each chip costs \$220. By 1985, high-volume pricing is expected to be in the \$20 to \$60 range. National Semi is located at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

IBM Micro Basis For Turnkey

SAN FRANCISCO — During the recent annual convention of the Independent Insurance Agents of America here, Agency Management Systems, Inc. (AMS) announced a turnkey agency management and marketing microcomputer system based on IBM's Personal Computer and AMS' software that was previously developed for use on the IBM Series/1.

AMS is owned by an open-ended consortium that is presently comprised of six major insurance companies, according

(Continued on Page 76)

Morrow Micro Based On Hard Disk, Z80

SAN LEANDRO, Calif. — Morrow Designs, Inc. has unwrapped a hard-disk-based microcomputer that holds 11M bytes of storage and runs programs compatible with Digital Research, Inc.'s CP/M operating system.

Aimed at the independent businessman, the Morrow MD11 is built around Zilog, Inc.'s Z80 microprocessor, has 128K bytes of random-access memory (RAM), 8K bytes of read-only memory, a 400K-byte floppy disk drive used to back up the hard disk, a parallel Centronics Data Computer Corp. port for easy printer hookup and three serial ports.

A spokesman said two of the three serial ports are standard RS-232 ports with the third capable of operating in any one of several modes, including a high-speed RS-432 port running at 500K bit/sec and a bi-

synchronous mode allowing the MD11 to communicate with IBM mainframes.

The MD11 comes bundled with eight software packages. The CP/M operating system allows the MD11 to address more than 64K bytes of RAM as well as Microsoft, Inc.'s version of Basic 80 and Basic, which is compatible with North Star Computers, Inc. Basic.

Application packages include New Word word processing, Logicalc financial spreadsheet, Correct-It spelling checker, Personal Pearl data base manager and the Quest Bookkeeper System.

The terminal that comes standard with the systems has a 12-in. screen that displays 24, 80-char. lines.

The MD11 is priced between \$2,800 and \$5,000, Morrow Designs said from 600 McCormick St., San Leandro, Calif. 94577.

Flex Diskette Targets Portable Micros

SANTA CLARA, Calif. — Dysan Corp. has announced the Flex Diskette, its first 3¼-in. microfloppy disk designed for use with portable and other microcomputer systems.

The disk reportedly offers a data storage capacity of 1M byte, equal to the capacity of a 5¼-in. flexible disk at one-third the size. The upgraded perfor-

mance level of the disk is represented by a bit-packing density of 9,000 bit/in. and 140 track/in.

Plug-in-compatible with 5¼-in. diskettes, the Flex Diskette was developed with a metal hub said to improve stability and performance of the disk. It was designed with the same media coating standard that is

utilized in 1.6M-byte and 3.3M-byte advanced 5¼-in. disk drives.

Guaranteed 100% bit-error-free, suggested retail price for a box of five Flex Diskettes, with 512K-byte capacity each, is \$21.50, a spokesman said. Dysan is located at 5201 Patrick Henry Drive, Santa Clara, Calif. 95050.

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Micros vs. Minis: What's the Real Advantage?

(Continued from Page 75)

In this same vein, the mini would compare unfavorably with the super-mini and the supermini with the mainframe. There is only one factor that causes a break in this logic and stops all small businesses that can afford it from having mainframes installed. That factor is cost. Thus we can narrow our discussion to minis vs. micros.

Marketing considerations will always dictate how computers are packaged for the business user. This translates to designing computers so that when growth requires more computer power, the business is faced with a purchase of full system replacement rather than mere additional pieces to the existing boxes.

This is apparent when one realizes that a micro with a Digital Equipment Corp. PDP-11/23 in the package of the DEC Professional 350 is priced at less than \$10,000. However, packaged as a mini, the price of a full system is greater than \$20,000.

Forget About Conversion

There is no way to get from the Professional to the PDP-11 without replacing all peripherals. Thus, when the small business advances from a micro to a mini, the micro should probably be used for some other task within the organization rather than being considered as a system that can be converted into a more powerful mini.

Although the micro had the advantage when a company first began to use a computer, once the company outgrows the system, it ends up purchasing a mini anyway. If this growth could have been predicted, the mini should have been purchased in the beginning, saving all the headaches of getting from here to there. My experience says that this growth can be predicted.

It is rare when a first-time user will believe that he is going to outgrow something as powerful as some of the micros that are on the market today. But he will, because even the best executives today don't realize

how important all information, known and unknown, is to every business decision. Once this is realized and the company measures the time its staff has to input information to the computer, the small disk (less than 30M bytes) and the limited number of terminals (less than four) are great obstacles to overcome. Someday, there won't even be a make-believe line between minis and micros, but that will only mean that cost will not be the dividing factor between the two. When this is a reality, micros as we know them today will lose their advantages.

The vendor stands on the other side of the transaction when a small business purchases a computer system. What advantage do micros have over minis from this point of view? And what does that mean to the purchaser? And why should this be important to the purchaser anyway?

Small businesses have learned very quickly that if a computer is to

be integrated into a company, whoever does a better selling it should be ready to support it throughout its life. Small businesses have neither the desire nor the time and ability to be self-supporting. The vendor then wins the duties of support by default.

The importance of support to the small business market means that the vendor has to receive enough profits from his sale and support activities to remain in business. In most cases, profits are directly related to the purchase price. The smaller the price, the less the profit.

Think about how long a strong technical person making \$20,000 to \$40,000 per year can spend with a computer system that contributed only \$2,000 to the selling company's profits. The answer usually means little or no support. The purchasing company then has to hire the support or not realize the full potential from its computer system. When comparing the original purchase

prices of minis and micros, the overall cost may be close to breaking even.

Of course, from the selling company's point of view, volume is the answer to the above paradox. The more systems sold, the more profits. Micros, with their lower cost, are easier to sell. Thus, the vendor would be able to make as much selling micros as minis. However, from the purchaser's side of the transaction, the more customers there are to support, the less time and talent there is to spend on each one.

What, then, are the advantages of any one type of computer over another type for the serious small business purchaser? The advantage is always where it is with any other business purchase. The transaction has to contain the following elements to be a good decision:

- The purchased resource has to have more potential than what is believed to be needed, if company growth is involved.

- The computer has to offer as much upward growth as possible, even if the above is true.

- The vendor has to be willing and able to give as much support as needed. Multiply expected needs by four.

- The vendor has to get a fair price for a good product to make the above come true.

Lewis is president of Iowa-based Specialty Computer Services, Inc.

Turnkey Based on Micro

(Continued from Page 75)

to a company spokesman.

AMS Micro reportedly features AMS marketing and management software packages bundled into the IBM Personal Computer and running under IBM's PC-DOS operating system. It also features a color monitor with visual prompts, a streamer cassette tape for backup and windowing capabilities enabling the user to view multiple elements on the screen simultaneously, the spokesman said.

The package includes accounting, billing, client services, diary, word processing, query and marketing capabilities in addition to a mouse that enables information to be located and manipulated on the screen without using the keyboard, according to AMS. All programs are written in Cobol.

The microcomputer package includes a 160 char./sec multimode matrix printer with draft and letter-

quality print capability, 256K bytes of internal memory, a 35M-byte disk drive that is expandable to more than 100M bytes and full interfacing capabilities.

The package is priced at approximately \$15,000. More information is available from AMS, Suite 300, 150 Interstate N., Atlanta, Ga. 30339.

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THE BRIDGE

TI's Micro With 12K Bytes Of On-Chip ROM Unveiled

DALLAS — Texas Instruments, Inc. has unwrapped what it claims is the first 8-bit, single-chip microcomputer with 12K bytes of on-chip, read-only memory (ROM).

The TMS70120 reportedly can store a complete, 12K-byte applications program without the need for any external ROMs, buffers or latches. By reducing the chip count for applications in the 4K- to 12K-byte program range, the microcomputer can help lower the cost, power consumption, weight and space requirements of many 8-bit applications, the ven-

dor claimed.

Moreover, the TMS70120's large on-chip memory is said to free up the 20 or more general-purpose I/O lines usually required to interface a microcomputer with off-chip ROMs. This reportedly gives designers greater flexibility to enhance an application by interfacing the TMS70120 to various peripherals.

Other features include 128K bytes of random-access memory, 64K bytes of address space and 32 individual I/O lines. Fabricated using Nmos technology, the device operates from a single 5V supply and costs \$11.05. TI can be reached through P.O. Box 401560, Dallas, Texas 75240.

Telex Computer Announces Daisywheel

TULSA, Okla. — Telex Computer Products, Inc., has introduced an 80 char./sec daisywheel printer that features interchangeable printwheels and produces letter-quality output.

The Telex 286F is a bidirectional printer that accommodates both plastic and metal printwheels of either 127 or 96 characters and is plug-compatible with IBM's 3278 terminal. It also can be attached to either a Telex 174/274C/276 or IBM 3274/3276 controller.

The printer's operator console configures line spacing of 6 or 8 line/in., with 10 or 12 char./in.

Independent microprocessors control all printwheels, carriage and paper-feed mechanisms, as well as providing extensive diagnostic routines for rapid-fault isolation, the vendor said.

The Telex 286F is priced at \$5,350, with the first deliveries scheduled to begin this month. Further information is available from Telex Computer Products, which is located at 6422 E. 41st St., Tulsa, Okla. 74135.

Facit Option Out For Its 4542, 4544

NASHUA, N.H. — Facit, Inc. has announced the Plot 10, a plotter/printer option for the firm's 4542 two-color and 4544 multicolor printers.

The option allows the printers to switch from graphics functions, such as grey-scale scanning, to high-performance DP printing, such as conventional text. In addition, the unit has the ability to mix plot and text modes, according to the vendor.

The Plot 10 also provides an interface to the firm's Facit 5162 front-end processor. This, the vendor said, provides additional plotting capabilities to the firm's 4544 and 4542 printers. The 5162 interface also includes a 8K-byte printer input buffer, the vendor said.

The 4542 with the plotter/printer option costs \$3,900. The 4544 with the plotter/printer option costs \$4,600. More information about the Plot 10 is available from Facit at 235 Main Dunstable Road, Nashua, N.H. 03061.

Disk Drive Holds 600K Bytes On Single Flexible Cartridge

SANTA ANA, Calif. — A flexible disk drive said to be the smallest in the computer industry and capable of storing up to 600K bytes of data on a single 3-in. flexible disk cartridge has been introduced here by Janome Sewing Machine Co., Ltd. of Tokyo.

The Janome MFD-80 Micro Flexible Drive reportedly is fully plug- and format-compatible with standard 5¼-in. minifloppy disk drives. It is also compatible with minifloppy mounting enclosures, so up to four drives can be placed vertically in a 5¼-in. footprint.

The drive is said to record double-density and double-sided on

the standard 3-in. disk cartridge at 100 track/in. Capacities are specified for the MFD-80 at 250K byte/side or 500K byte/disk, using the standard 40 track/side mode. Using all 48 tracks reportedly boosts capacity to 300K byte/side or 600K byte/disk.

The high-torque, indirect-drive motor provides fast disk start times, but with lower drive currents and heat generation, the vendor said.

The MFD-80 is priced at \$125 each in OEM quantities. Further information is available from The Allen Group at Suite 108, 2030 E. Fourth St., Santa Ana, Calif. 92705.

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Bits & Pieces

Quantex Reduces Prices On 7000 Family Printers

HAUPPAUGE, N.Y. — The Quantex Division of North Atlantic Industries, Inc. has announced across-the-board price reductions for its 7000 family of dot matrix printers, now that the latest addition to the product line, the Model 7020, is in full production.

As models have been added to the printer family, the company has established prices in accordance with the functionality of each model, as well as passing along savings realized from manufacturing efficiencies, the vendor said.

Effective immediately, list pricing will be: \$1,495 for the Model 7020;

\$1,695 for the Model 7030; and \$1,795 for the Model 7040. The Quantex Division is located at 60 Plant Ave., Hauppauge, N.Y. 11788.

Circuit Board Will Connect IBM's Micro and CDC's ISI

FORT WORTH, Texas — Ribigital Electronic, Inc. (REI) has announced a circuit board said to connect the IBM Personal Computer with Control Data Corp.'s Industry Standard Interface (ISI) for disk drives. It breaks the 1G barrier and increases data integrity for the Personal Computer, the vendor said.

REI has designed two versions of its ISI adapter module for the Personal Computer. The Model 927 is a program I/O version that has been test-

ed with the CDC 9050 and 9056 control modules and will be available in January. It costs \$395.

The Model 9270 is a direct-memory access version, is also available in January and costs \$495. Both versions support multiple control modules, mix or match.

REI is located at 3612 W. Vickery Blvd., Fort Worth, Texas 76107.

Overland Data's Controller Targets IBM Micro

EL CAJON, Calif. — Overland Data, Inc. has announced the Model TC-PC nine-track tape controller for the IBM Personal Computer.

Capable of reading and writing ½-in. magnetic tape, the unit accommodates speeds up to 125 in./sec and

transfers data at up to 200K byte/sec. Interrupt processing during data transfer is allowed through the use of direct memory access, a spokesman said.

The Model TC-PC is compatible with most nine-track formatted tape drives, including those from Cipher Data Products, Inc.; Innovative Data Resources, Inc.; Kennedy Co.; Pertec Computer Corp.; Control Data Corp.; and Datum, Inc. It is available with interconnect cables and software for \$770 plus shipping.

Overland is at 1425 Monte Rico Drive, El Cajon, Calif. 92021.

Ribbons, Printwheels Fit Xerox Diablo, 800 Printers

CHICAGO — At the 1983 National Office Products Association Convention here recently, Qume Corp. introduced Superstrike ribbons and printwheels for use on Xerox Corp.'s Diablo printers and 800 series printers.

The supplies are reportedly available for use on the Diablo Hytype I, Hytype II, Diablo 630 and 800 series. The printwheels reportedly feature IBM-style typefaces and will be available in 10 different type styles; elite and manifold typefaces will be released in December.

Prices for the printwheels start at \$4.20 each in gross shipments, and ribbons start at \$3.80 each in gross shipments. Further information is available from Qume, 2350 Qume Drive, San Jose, Calif. 95131.

Adaptec's Chip Set Supports Seagate Technology Interface

MILPITAS, Calif. — Adaptec, Inc. has announced immediate support for capability for Seagate Technology, Inc.'s ST412 high-end 5¼-in. Winchester drive interface.

Customers selecting Adaptec's ACS-1000 Winchester controller chips reportedly can build ST412 interface controller boards, which operate at a 10M bit/sec data transfer rate. This doubles the data rate of Seagate Technology's original ST506 interface, the vendor said.

The ACS-1000 chip set is said to include the vendor's AIC-100 Winchester controller chip, the AIC-250 encoder/decoder chip and the AIC-300 buffer controller chip.

The ACS-1000 chip set costs \$210 each from Adaptec, 1625 McCarthy Blvd., Milpitas, Calif. 95035.

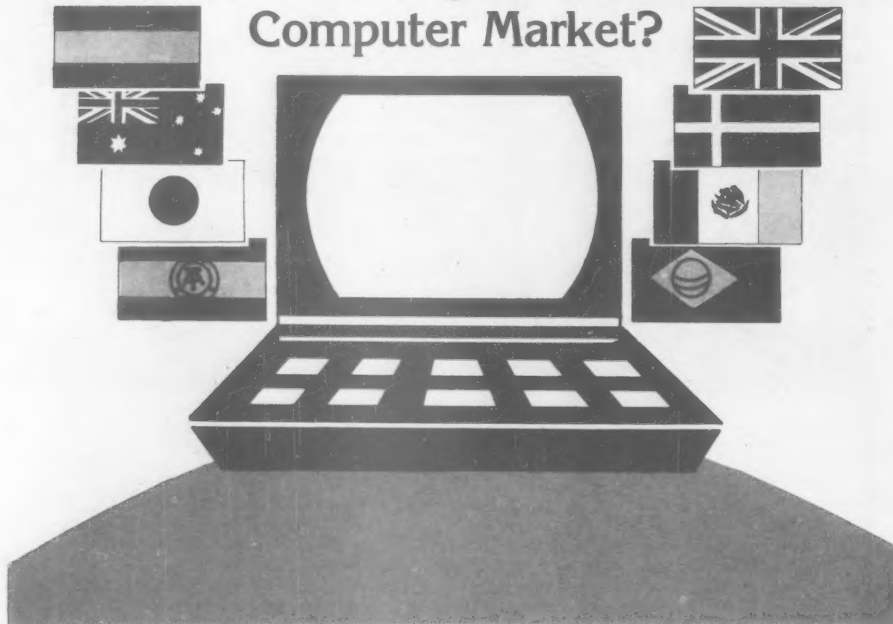
Software Engineering Tool Runs on Nastec Workstation

TOPEKA, Kan. — A computer-aided software engineering tool for the Nastec Corp. Case 2000 workstation was announced recently by Nastec and Ken Orr & Associates, Inc.

Documentorr reportedly automates the preparation and maintenance of complete design documentation for Ken Orr & Associates' Data Structured Systems Development (DSSD) methodology. It produces a comprehensive set of interactive menus that allows users to organize system design documentation in the DSSD methodology life cycle.

A user license for Documentorr costs \$2,500 per workstation, and annual maintenance is \$1,500 from Ken Orr & Associates, 1725 Gage Blvd., Topeka, Kan. 66604.

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Rack-Mountable

Winnie Supports DPS 6, Level 6

SCHILLER PARK, Ill. — Knaus Systems, Inc. has announced a Winchester disk drive for users of Honeywell, Inc. DPS 6 and Level 6 processors.

The Parrot is rack-mountable with four units in a 60-

Minifloppies Boast Variety Of Storage

TORRANCE, Calif. — Comrex International, Inc. has introduced a family of minifloppy diskettes said to feature a variety of storage capacities for use with microcomputers and word processors using 5¼-in. diskettes.

Available in three capacities, the Comrex diskettes reportedly provide users with the flexibility of choosing the exact storage density and surfaces they need. The Model CR-10005 offers the capability of recording on a single disk surface and with single density. The Model CR-10010 offers single-sided, double-density recording, the vendor said. Double-sided, double-density recording is featured on the Model CR-10015. All are guaranteed for five years.

Also available is a premium diskette, the Model CR-10020, with double-sided, double-density recording and a lifetime guarantee.

The diskettes are configured with a soft-sectored format, a single index hole, 48 track/in. density and 40 tracks for each recording surface.

Ten-pack prices are \$29.95 for the Model CR-10005, \$44.95 for the Model CR-10010, \$49.95 for the Model CR-10015 and \$59.95 for the CR-10020. Comrex International is at 3701 Skypark Drive, Torrance, Calif. 90505.

Boschert Offers XL750 Switchers

SUNNYVALE, Calif. — Boschert, Inc., a manufacturer of switching power supplies in the 25W to 1500W range, has a new family of 750W enclosed multioutput switching power supplies.

The XL750 line of switchers is designed for computer systems, transaction processing systems and supermini-computers. It features Boschert's proprietary proportional drive and current mode design.

The XL750 line is available now at prices ranging from \$656 to \$825 in quantities of 250. More information is available from Boschert at 384 Santa Trinita Ave., Sunnyvale, Calif. 94086.

in. cabinet or two units in a 30-in. cabinet. The 10½-in. drive weighs 110 lb and is said to be virtually maintenance-free.

It reportedly is cartridge module disk plug-compatible and software compatible to 256M bytes of storage module disk (SMD).

The Parrot's maximum storage capacity is 315M bytes and is compatible with

Honeywell's Mass Storage Unit 9604 with 256M bytes of SMD, a spokeswoman said. Its sealed fixed disk guards against head crashes.

The Parrot comes standard with dual port, address mark, rack mount slides and terminator and costs \$15,990.

Knaus Systems can be reached at 9950 W. Lawrence Ave., Schiller Park, Ill. 60176.

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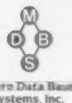
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VAX/Unix Combination Released as Turnkey

FREMONT, Calif. — Voelker-Lehman Systems, Inc. is offering a turnkey system combining Digital Equipment Corp.'s VAX-11/750 superminicomputer with the Unix operating system.

A company spokesman said the VAX/Unix implementation is suited for image processing and mul-

tiuser software development applications.

The system costs between \$80,000 and \$160,000 depending on the configuration.

Further information on the turnkey is available from Voelker-Lehman at 44160 Old Warm Springs Blvd., Fremont, Calif. 94538.

Memory Board Out for VAX

CARROLLTON, Texas — Mostek Corp. has announced the Mostek MK8076 add-in memory board for the Digital Equipment Corp. VAX-11/730 and VAX-11/750 minicomputers. This memory board, which the company said is a direct replacement for the DEC M8750 memory board, features a storage capacity of 1M byte. The Mostek board utilizes 64K dynamic random-access memories (RAM) that are up-

gradable with 256K dynamic RAMs that boosts the potential memory capacity to 4M bytes on a single array card, Mostek said.

Additional features include a data transfer rate of 39 bit/sec, an on-line/off-line switch and three LEDs indicating board access, power and on-line/off-line status. The board also supports battery backup operation, Mostek said.

Single quantity pricing

for the Mostek MK8076 memory board is \$2,450, with quantity discounts available from Mostek at 1215 W. Crosby Road, Carrollton, Texas 75006.

Shufflebuffer Announced

BALA-CYNWYD, Pa. — Interactive Structures, Inc. has released Shufflebuffer, a printing buffer that performs mix and merge print-out operations previously available only by using software or scissors and paste.

Shufflebuffer can shuffle text, graphics, spreadsheet information and other computer-generated material into any combination for printing, plotting or telephone transmission. Applications include mailing lists, letter mergings, preparation of personalized form letters and other repeated or rearranged material. Shufflebuffer reportedly lets all of the user's programs work together, effectively bringing software integration to the smallest microcomputer.

The product has two additional modes of operation: the standard "dumb buffer" function of the first in, first out printing of material that does not need rearranging or reprinting, and Bypass, which interrupts a long printout in order to produce a separate document on an immediate basis.

Shufflebuffer is an enhanced version of Interactive Structures' Pipeline, the first random-access printing buffer on the peripherals market. It reportedly features front panel controls to permit stacking and is narrow enough to fit beneath a disk drive unit.

More information is available from the vendor at 146 Montgomery Ave., Bala-Cynwyd, Pa. 19004.

Keyboard Fits IBM Micro

NORCROSS, Ga. — The Keytek Division of Elco Corp. has announced the Inductric, a low-profile keyboard which is compatible with the IBM Personal Computer.

The unit is available with a synchronous or asynchronous RS-232 format. Features include familiar key replacement, microprocessor-based electronics and solid-state inductive switches. Included with the keyboard is an interconnect cable for use with either the Personal Computer or serial TTL Ascii systems, the vendor said.

The keyboard costs \$250. Keytek is at 6424 Warren Drive, Norcross, Ga. 30093.

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'Now That We've Eliminated Human Error ... Who Do We Send Out for Coffee?'

OA Packages Out for UX16-20 Micro

PHOENIX — The Systems Division of SGS Semiconductor Corp. has introduced a set of office automation software packages for its UX16-20 multiuser microcomputer running its Sunix operating system.

Menu is a menu-driven software package said to guide inexperienced users through Sunix and application packages available from SGS. These include Word, a word processor, and Telex Plus, a package for sending telex messages. Other packages are RM/Cobol, a business language package, and Unify, a data base management package.

All packages will be available in December from an SGS sales representative or sales office. The prices of the packages are Word, \$1,295;

Menu, \$695; Telex Plus, \$995; RM/Cobol, \$1,250; and Unify, \$2,995.

More information on these prod-

ucts is available from the company at 1000 E. Bell Road, Phoenix, Ariz. 85022.

Northern Telecom Announces Storage Unit for Desktop Model 503

MINNEAPOLIS — Northern Telecom, Inc. has announced the addition of a 10M-byte hard disk storage unit for use with its Model 503 desktop office information system.

The storage unit, designated the 5010, is a self-contained storage subsystem housed in the same cabinet used for the existing system, a spokesman said. It reportedly contains one 5¼-in. floppy disk for pro-

gram load and backup and one 5¼-in. Winchester hard disk drive for storage. The floppy disk provides approximately 800K bytes of storage.

The unit contains its own power supply and logic cards and is electronically connected to the storage unit over a shielded ribbon cable, according to the vendor.

The storage unit is available for \$3,780. More information may be obtained through Northern Telecom, Data Park, P.O. Box 1222, Minneapolis, Minn. 55440.

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E-Mail to Win Over Offices

(Continued from Page 81)

Other reasons cited by the report for increased user acceptance of electronic mail is the improvement in the price/performance ratio of the components.

The user-friendliness of CBMS software is another contributing factor as is the growing standards effort, IDC said.

IDC also identified several reasons why users will find CBMS better than other messaging systems such as voice and paper. One of the attributes of CBMS is that the user can leave a message without having to know where the intended recipient is before or after standard business hours, "largely relieving time-window constraints for communicators," the study said.

In addition, a time-sensitive message intended for several recipients can be distributed more efficiently through a CBMS than through other systems, according to the report.

The report is available for \$2,500 from IDC, Five Speen St., Framingham, Mass. 01701.

Wang Introduces Training Method

(Continued from Page 81)

is not a simulation, a Wang spokesman said.

Wils can be used with the following Wang systems: the OIS 115-3 and 115-4, the OIS 130A-E, the OIS 140, the OIS 145 or any VS system with integrated word processing.

The user can control the pace and sequence of training by using the existing keypad located on a standard Wang combined workstation. These keys allow the user to pause, review course material already covered or skip ahead to train on any system function.

Wils is available for \$5,000, which does not include the optical laser video disk player, the color video monitor or the Wang workstation.

More information is available from Wang, One Industrial Ave., Lowell, Mass. 01851.

DM Data Cites Major Contenders

Race to Produce 256K-Bit Chip Heats Up

By Robert Batt

CW West Coast Bureau

PALO ALTO, Calif. — The race to produce and market the 256K-bit dynamic random-access memory (RAM) chip is heating up as U.S., Japanese and European manufacturers battle it out to obtain market dominance.

According to DM Data, Inc., a Scottsdale, Ariz.-based market research firm, 17 semiconductor companies are now in a position to be one of the four or five major worldwide suppliers of the new chip, with quantities expected to exceed 500 million devices a year by 1988.

The technology, DM Data stated, is at the sampling stage, with newcomer Western Electric leading a pack of U.S. companies that includes Motorola, Inc., Texas Instruments, Inc., Intel Corp. and National Semiconductor Corp.

On the Japanese side, Hitachi Ltd. is thought to be out in front, with Fujitsu Ltd. and Nippon Electric Co. in close at-

tendance. The British company Inmos, backed by government funds, and Siemens Corp. of West Germany are the European contenders.

"Assuming that the usual electrical specifications such as speed match the market demands, the winners will be determined by their approach to the design, the use of redundancy and the resultant die size," claimed Howard Dicken, president of DM Data.

Shakeout by Late '84

For this product with die sizes in the range of 50,000 to 75,000 square mils (thousandths of an inch), the wafer-probe yields in full production will initially range from 5% to 20%.

According to Dicken, to improve the effective die yield and lower the cost, most vendors are using redundancy, making extra columns of memory available that can be programmed to replace defective components. This is accomplished by add-

ing extra columns of memory cells and applying some type of laser programming to switch to the good sections.

The extra testing and reprogramming adds to the manufacturing cost of the wafer, Dicken said, and eventually there is a trade-off between this added cost and yield improvements. Dicken asserted the cost of manufacturing will become prohibitive for several companies, and he predicted a shakeout in the market by late 1984.

"Although several Japanese companies are ahead in offering samples now, the first designs on the market are not always the final leaders," he warned.

The companies to watch, Dicken added, are those gambling on starting with a non-redundant design. "If their initial yields are high enough, they will eliminate the retooling costs and have a one- to two-year lead on the experience curve for that design," he explained.

(Continued on Page 86)

Things Not Going Well This Year for IPL

By Tom Henkel

CW Staff

WALTHAM, Mass. — Sagging sales and technical problems with a new processor have made 1983 a year Steve Ippolito may want to forget.

Ippolito's firm, IPL Systems, Inc., is expecting to post its third straight quarterly loss for the period ending Oct. 1. The loss, which the firm estimates will be about \$1.1 million, comes on the heels of IPL's announcement that it will delay first shipments of its recently announced IBM-compatible 4480 processor [CW, Feb. 14] until glitches with the parallel processor are resolved.

Joking in a recent interview that it would be hard for things to get much worse, Ippolito admitted his firm may have made some mistakes over the past year. "But even if we had done everything perfectly, there would still have been a loss,"

Ippolito said, noting that the IBM-compatible business is cyclical and firms have to be ready to take the good years with the bad.

Until 1983, IPL was riding high on 24 straight profitable quarters ending in 1982, when the firm finished off the year with net earnings of \$277,000. But business took a downturn in 1983. The first quarter, IPL posted a \$247,000 net loss. The second quarter brought a \$327,000 net loss.

Timing has played a pivotal role in IPL's problems. With the summer typically a slow time for processor purchases, Ippolito said IBM's selection of September to announce the 4361 and 4381 caused what little interest there was in 4300-compatible systems to bottom out.

That slump, Ippolito maintained, has affected not only IPL, but also its competitors:

(Continued on Page 85)



CW File Photo

"Up until now we have been pretty good at making our deadlines. Personally, it bothers me — I don't like to slip a schedule like that," IPL Systems President Steve Ippolito said recently of the 4480 shipment delay.

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NCR Posts Record Earnings in Third Quarter

By David Myers

CW New York Bureau

NEW YORK — NCR Corp. enjoyed record profits in the third quarter as mainframes continued to pace earnings while the firm's fledgling semiconductor works broke even, Charles E. Exley Jr., president and chief executive, told a meeting of security analysts here last week.

The Dayton, Ohio-based computer maker earned \$70

million in the third quarter, an amount that included an \$8.4 million sale of securities. With that item removed from the total, NCR still earned 23% above its \$50.1 million bottom line in the third quarter of 1982.

Asked by an analyst at the meeting if it would be "fair to say that these are the best results since you joined the company" seven years ago, Exley said, "Yes," lit up a ci-

gar and grinned.

"NCR is a financially strong company not dependent on any one product or any one market. We traditionally describe our performance in adjectives — good, very good, substantial, very substantial. We have used our maximum adjectives in describing our third-quarter order gains," Exley said.

NCR sold just under \$878 million worth of its 250 dif-

ferent types of products during the third quarter, a 5% jump over its third-quarter sales last year of \$840.1 million.

Exley declared that the strength of the U.S. dollar overseas "continued to affect adversely our revenues and income," especially in Europe.

Asked what "adverse developments" might shave the company's profit mar-

gins next year, Exley listed growing strength of the dollar, unexpected price erosion and a shortage of semiconductors forcing NCR to go to electronics distributors for parts.

In other replies to analysts' questions, Exley said NCR would not enter the home computer market, has no plans for acquisitions and expects to announce shortly a pilot installation of self-service ticket terminals with "a major airline."

He also said NCR plans to expand its office automation offerings by "focusing on integrating products" and is seeing the first strong returns from the sales team it formed to go after Fortune 500 accounts, where, Exley admitted, the company had "until now been lightly represented."

"We do not have in mind entering the home computer market," the NCR chief declared, describing the firm's recently unveiled personal computer as a business professional's machine. But Exley acknowledged that two dozen entrants in that niche of the market confront NCR with "a challenge to stand out."

'Leg Up With Dealers'

But Exley said that NCR's name would give it a leg up with dealers, and "nobody is worried about our going out of business. That has become a factor of some importance in choosing a personal computer," he noted.

Allowing that his company is cash rich, Exley nevertheless said NCR has no plans "at all for acquisitions. Speaking as an individual, I'm not particularly acquisition-minded."

Even so, he pointed out that under its recent reorganization into three main business units — production, marketing and product integration — NCR is better equipped to handle acquisitions than before.

In the first nine months of the year, NCR's profits climbed by 23% to \$173.2 million from \$140.4 million in the same term last year. Sales for the period increased by 5% to \$2.59 billion from \$2.46 billion in 1982.

Analysts at the meeting described Exley's presentation as "generally upbeat."

"The only question is whether he'll be able to ship products," one analyst said, noting that Exley had mentioned a creeping shortage of flexible disks in informal chats before the meeting. "If his orders remain as strong in the fourth quarter as they were in the third, he may exhibit some product shortages."

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Predicts 50% Annual Growth Rate

IDC Sees Swelling Market for WP Applications

By Peter Bartolik

CW Staff

FRAMINGHAM, Mass. — With only one in five white-collar workers today using an electronic keyboard device of any type, the market potential for word processing applications from independent suppliers will result in a 50% annual growth rate compounded over the next five years, according to a study recently released here by International Data Corp. (IDC).

"Packaged Software: Value-Added Opportunities in the Office," a 102-page report by IDC's Continuous Information Services, concluded that as the capabilities of different hardware converge, software is becoming the key to office automation.

However, the market is said to be in a state of transition, with vendors casting about "trying to decide which office tasks are hot items to automate and what should be integrated with what."

At least 70% of all U.S. businesses are presently using typewriters for text handling functions, according to IDC, leading to increased competition in the hardware market.

Wang Laboratories, Inc.'s 50% share of the clustered

WP market is being squeezed by minicomputer industry leaders such as Digital Equipment Corp., Prime Computer, Inc. and Hewlett-Packard Co.

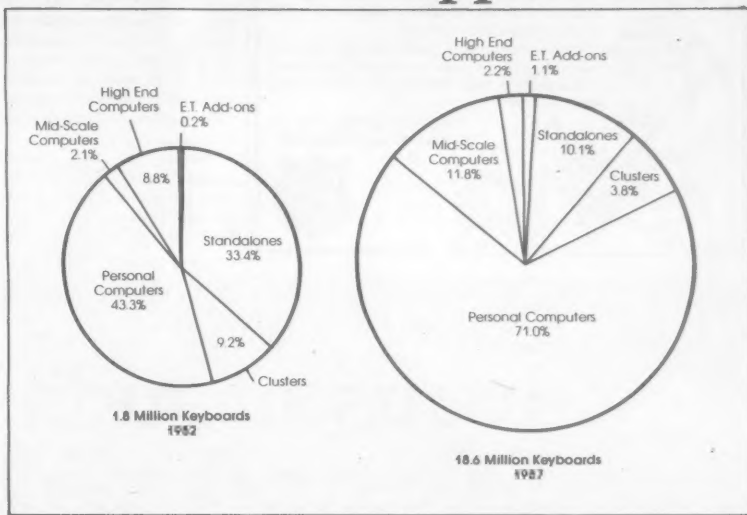
More than half of all word processing done today, IDC estimated, is done on systems other than dedicated word processors, and the percentage is expected to rise through the rest of this decade.

"This is because word processing software designed for general-purpose data processing equipment is better than it used to be and because the hardware suitable for small-scale word processing is getting cheaper," according to the report.

Software to Increase

Office software is expected to increase from 7% of the applications solution software market in 1982 to 9% in 1987, IDC said.

While hardware vendors "may be in a better position to offer maximum integration with their operating systems and with the software libraries they presently possess," according to IDC, applications software has traditionally been the domain of independents, "and there is no indication that this will change significantly in the



The Total Word Processing Market

IDC Chart

next five years."

In the large system market, the report noted that "in both word and action, the hardware manufacturers have clearly indicated that their future growth rides on the successes they chalk up as major software suppliers."

The impact of personal computers has had a significant impact on the market place, IDC said. "[Personal computer] vendors and independent software companies realize that the market for word processing capability far exceeds the market for dedicated word processors, and they are furiously developing word processing packages for the [personal computer]."

Integration of WP and DP is a central issue in the office automation market, with management workstations "where the action is in the 1980s," according to IDC, and the integration "is particularly a software issue."

It is expected to be a fierce market, IDC said, and while few word processors installed to date are genuinely multifunctional, IDC expects that 80% of the installed base will be capable of performing multifunctional tasks by 1987.

IDC projects graphics software packages and intelligent graphics terminals for use as office-type applications should average 40% to 50% growth rates over the

next several years and that the personal computer graphics market should experience revenues in the \$50 million range in 1987.

While word processing will continue to be the most popular application in office automation software — presently 95% of total office packages — IDC sees a potential challenger in the development of data base management systems, which "is a market with overwhelming growth potential as the amount of electronically stored information continues to increase."

More information on the study is available from IDC, 5 Speen St., Framingham, Mass. 01701.

IPL to Post Loss Again

(Continued from Page 83)

National Advanced Systems, Inc., Cambex Corp. and, to some degree, Magnuson Computer Systems, Inc. (which had filed for protection from creditors under Chapter 11 last spring). In fact, Ippolito said, until the 4361 and 4381 announcements, even IBM was having trouble selling 4300 systems.

As if slow sales were not bad enough, September brought another disappointment for IPL. With early versions of the new 4480 ready for delivery, IPL engineers discovered a problem with the dual processor, which did not allow the two central processing units to communicate properly with each other. The firm was forced to delay the first scheduled delivery of the machine. That delay boosted the firm's expected third quarter net loss by about \$500,000.

"This is the 4480 that doesn't work," Ippolito said, pointing to a test system in IPL's Waltham, Mass., manufacturing facility.

IPL expects to resolve the problem with the 4480 before the end of the year; but Ippolito is concerned the delay may already have dam-

aged IPL's reputation.

"Up until now, we have been pretty good at making our deadlines. Personally, it bothers me — I don't like to slip a schedule like that," Ippolito said.

But in spite of problems over the past year, Ippolito said IPL and the mid-range IBM-compatible business are poised for another growth period. In Ippolito's estimation, IBM has booked a backlog for 4361 and 4381 systems that it will not be able to fill quickly. If that happens, users will start turning to plug-compatible manufacturers' (PCM) systems to fill their needs.

"The market is enormous," Ippolito said, adding that since most industry watchers believe IBM's 4361 and 4381 processors will be the last additions IBM makes to the now aging 4300 line, more users will turn to plug-compatible versions of the 4300, which offer a better price/performance ratio than IBM. "We keep IBM honest," Ippolito said, noting that until PCMs started making products that competed with the IBM lineup, IBM was free to charge virtually anything for its systems.

This announcement appears as a matter of record only.

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Communications Services Sales Up

MCI Posts 51% Revenue Gain

WASHINGTON, D.C. — MCI Telecommunications Corp. posted a 51% revenue gain for its quarter ending Sept. 30 as sales of its communications services topped \$396 million compared with \$261 million a year ago.

Profits in the period jumped to \$51.5 million or 22 cents per share, up 37% from the same quarter a year ago. Both profits and earnings

showed lower per-quarter growth than in the last several quarters.

For the year ending Sept. 30, the company posted earnings of \$202 million or 92 cents per share, up from \$134 million, and sales of \$1.4 billion.

Commenting on the results, MCI Chairman William G. McGowan said that an expanded market for MCI will

become available as the breakup of the Bell system is implemented over the next three years.

"We are expanding our plant at a record pace and have increased our projected capital spending to \$1.1 billion for the current fiscal year," he explained.

McGowan said the results for the recent quarter were negatively impacted by increases in access charges mandated by the Federal Communications Commission as well as by spending on new businesses, including the recently announced MCI Mail.

McGowan added that MCI's fiber-optic system between New York and Washington, D.C., would be operational by early 1984 and that additional communications circuits would become available as a result of the company's purchase of 12 transponders on the recently launched Hughes Aerospace Co. communications satellite.

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Chip Race Heating Up

(Continued from Page 83)

Western Electric is the only U.S. company to have claimed to have produced 256K-bit dynamic RAMs in volume quantity, although the actual volumes are a closely guarded secret.

Tad La Fountain, senior analyst at Shearson/American Express, Inc., claimed the lack of commercial marketing experience in this sector will not be a hindrance to the AT&T subsidiary.

"Selling memory is a question of pure price. In the dynamic memory arena marketing is not so important since the product is easy to understand from a user point of view," La Fountain asserted.

Mike Krasko, special limited partner at L.F. Rothschild, Unterberg, Towbin, Inc. agreed.

"The existence of new players such as Western Electric means that, unlike the last memory cycle [64K], the Japanese and traditional U.S. merchant suppliers will have a stiffer run for their money than in previous product evolutions," according to Krasko.

Nevertheless, most analysts do not see the 256K-bit race as a make-or-break issue in the semiconductor market, although those companies whose technologies are memory-oriented, such as Mostek Corp. and Micron Technology, Inc., are thought to have more to lose.

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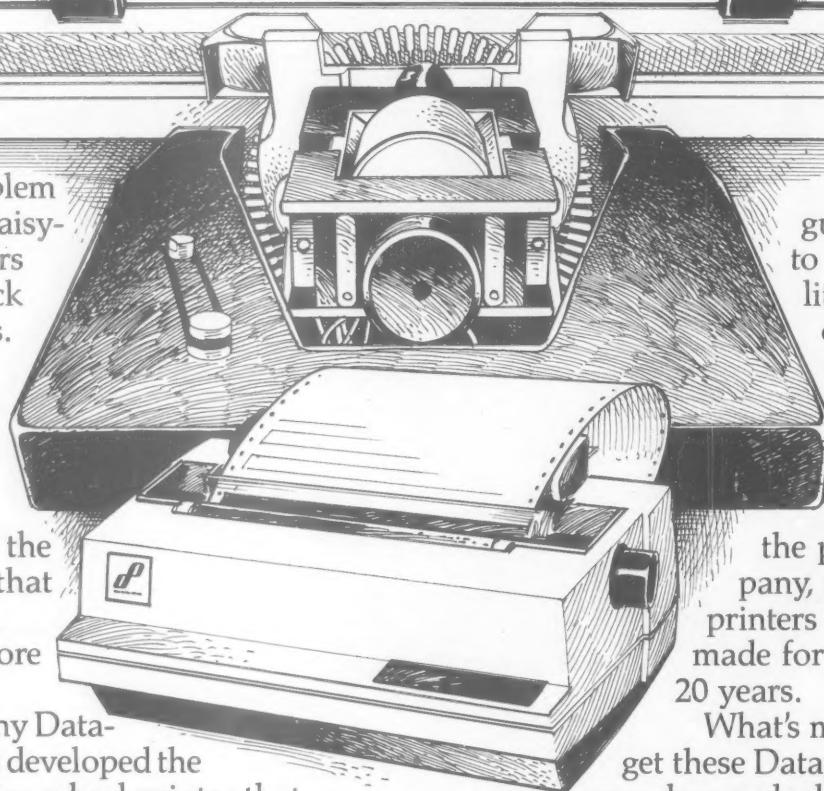
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Intel Earnings Hit \$32 Million In Third Quarter

SANTA CLARA, Calif. — Like other of its brethren in the semiconductor business, Intel Corp. has posted significant revenue and earnings gains for the third quarter, reflecting the rising tide of semiconductor demand globally.

Earnings at Intel were \$32 million or 29 cents per share, compared with earnings of \$8.5 million a year earlier. Revenues for the quarter topped \$292 million, a gain of nearly 23% over last year.

Commenting on the results, Gordon Moore, chairman and chief executive officer, said, "This upswing in demand is so great that orders for some products are well above our capacity to deliver, and we are working closely with customers to let them know how much product we can ship. Orders for Intel's microprocessors, microcontrollers and peripherals are especially strong."

Honeywell Plans Personnel Cuts

PHOENIX — As part of an overall restructuring to reduce production costs, Honeywell Information Systems' Large Computer Products Division will reduce its work force by 13%, or 500 employees, by the end of the year, the company announced recently.

Reductions will be achieved through a combination of layoffs, early retirements and transfers to other Honeywell divisions and will impact middle management, engineering and support personnel effective Nov. 3, the company said.

"We need to reduce our operating costs to remain competitive in today's marketplace," said Edward F. Manzer, the division's vice-president and general manager. "Streamlining operations and improving efficiency will position us to maintain our success in the long term."

Meeting to Focus On New Firms

PORTLAND, Ore. — The Second Annual Symposium for Emerging Companies, sponsored by members of the Northwest financial business community, will be held Nov. 1-3 at the Marriott Hotel here.

The symposium will provide companies with the opportunity to meet venture capitalists, investment bankers and professional investors; meet in private with individual venture capital representatives for in-depth discussion of prospects; and make important contacts for future financing needs.

The registration fee is \$400 and allows one to three members of a company's management team to attend. The fee includes all registration materials, a cocktail reception, continental breakfast and lunch.

Further information is available by contacting Symposium, 1200 Benjamin Franklin Plaza, Portland, Ore. 97258.

Quarterly Sales Top \$9 Billion Big Blue Reports 25% Earnings Jump

ARMONK, N.Y. — IBM's strong sales growth continued on track in the third quarter as the company reported an earnings increase of nearly 25% to \$1.3 billion or \$2.14 per share. Sales in the period were up 15% to \$9.4 billion compared with \$8.2 billion the same period a year earlier.

As further evidence of IBM's emphasizing a sale-over-lease strategy, equipment rentals dropped nearly 20% in the quarter. Analysts were uncertain if the bulk of this decline was being taken up by the company's leasing subsidiary, IBM Credit Corp.

For the nine-month period ending Sept. 30, IBM's worldwide earnings were up 24.5% over the same period

in 1982 to \$3.6 billion. Sales in the first nine months jumped 17% over the same period last year to \$27.2 billion. The only decrease shown on the report was a 15.1% decrease in rentals, again the apparent reflection of the company's efforts to discourage leasing arrangements by making outright purchases more attractive.

Chairman John R. Opel said the growth in earnings was due "both to strength in shipments of IBM products and services and to continuing improvement in the company's operating margins."

Worldwide net earnings for the first nine months of 1983 were reported to be \$3.6 billion, up from the

\$2.9 billion reported for the same period in 1982. Net earnings were \$5.98 per share, up 22.3%, based on 605.8 million shares. After-tax margins increased to 13.3% for 1983, up from 12.5% reported in 1982.

Opel said that shipments have been high for the 3380 disk storage device and that display products 3278, 3279 and 3178 continue strong. The 3080 series is being shipped at a high rate, and shipments of the largest in the series, the 3084 processor, began in September, Opel said. The company said it has experienced enthusiastic response to the IBM System/36 and is pleased with the success of the IBM Personal Computer.

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Company Mines New Distribution Channel By Holding Fairs for Exchange of Micros

By Robert Batt

CW West Coast Bureau

PALO ALTO, Calif. — The burgeoning growth of microcomputer usage in large organizations is leading to an increasing variety of distribution channels for the data processing professional.

One company that has taken advantage of this growth is Computer Swap America, a private company based here which specializes in holding computer fairs where vendors and users can meet to deal in both new and used equipment.

From a modest beginning in 1976, when 30 vendors and a few hundred people attended the first show, Computer Swap America has grown into a healthy \$1 million enterprise with four shows a year in California, the last one in Silicon Valley attracting some 200 vendors and 5,000 users. Now the company plans to go nationwide next year with some 48 shows in 12 different cities.

According to John Craig, founder of the company, attendees at the shows are computer and science engineers, programmer/analysts, DP managers, other executives, students and educators. They pay a \$5 entrance fee and are then left free to bargain hunt.

"These shows are primarily for the technically capable. Most buyers of personal computers need the full service and support offered by local

computer stores. Others, however, are technically oriented in buying and maintaining personal computers and can, therefore, avoid paying the full price," Craig explained.

According to Craig, the shows are eight hours of "high-intensity, no-frills buying and selling."

Vendors who have exhibited their wares at Craig's exhibitions are usually computer manufacturers, software producers, distributors and retailers. They include companies such as Hewlett-Packard Co., Zilog, Inc., Satellite Receiving Systems, Computeland and Atari Corp.

Used Peripherals

Much of the trading, Craig said, is in used peripheral equipment, with disk drives, printers, circuit boards and CPM software in heavy demand.

According to Craig, new IBM and Apple Computer, Inc. personal computers are also sold, with some mail-order companies, he claimed, netting \$20,000 in cash during a day-long show.

Although some minicomputer equipment — mostly related to Digital Equipment Corp. PDP-11 machines — has been traded, most of the activity is related to micros, with few buyers spending over \$1,000.

"From the vendor point of view these shows offer the chance to sell off surplus stock as well as top-of-the-line merchandise without hav-

ing to be concerned with follow-up service and support. From the user point of view, he is offered a mix of vendors offering personal computers and peripherals at bargain prices," Craig added.

As the personal computer market heats up and an industry shakeout begins, such shows, Craig said, can be expected to increase in number, appealing in particular to distributors who are left with equipment from a company that is in trouble. At Craig's last show personal computers from Osborne Computer Corp. and Fortune Systems Corp. were much in evidence.

"The growth of these shows has followed the growth of the personal computer industry, and as new products come on-line, so the used equipment market will also grow, particularly in the IBM and Apple computer ranges," Craig asserted.

Many of the buyers, he said, are do-it-yourself people, experimenting in such areas as laser techniques and biofeedback systems.

On the other hand, a DP manager, for example, often uses the show to buy supplies for his company's stock of equipment. "The message is getting out that this is a viable marketplace," Craig concluded.

New Companies

Ovation Technologies is a new firm that will develop and market business productivity software and integrated hardware for IBM and IBM-compatible personal computers. Ovation Technologies can be reached at 770 Dedham St., Canton, Mass. 02021.

Ultimate Computer Services of Denville, N.J., has opened branch offices at Two Executive Campus, Cherry Hill, N.J., and Two Penn Plaza, New York, N.Y., offering hardware support services in most IBM systems and peripherals.

Bellsouth Services is the holding company that will own and provide centralized support services for Southern Bell and South Central Bell following the breakup of AT&T on Jan. 1, 1984.

Microelectric Business International has been formed by a group of former investment bankers, international financiers and Far East industrialists to establish Far East manufacturing operations for American electronics companies. Dr. George Koo, formerly an investment banker with Chase Manhattan Bank, will head up the new organization, which is located at 444 Castro St., Mountain View, Calif. 94041.

Lincoln Property Co. has formed Lincom Corp., a telecommunications subsidiary that will design, install and manage telephone and other telecommunications within Lincoln commercial developments. Lincoln Property is located in Tampa, Fla.

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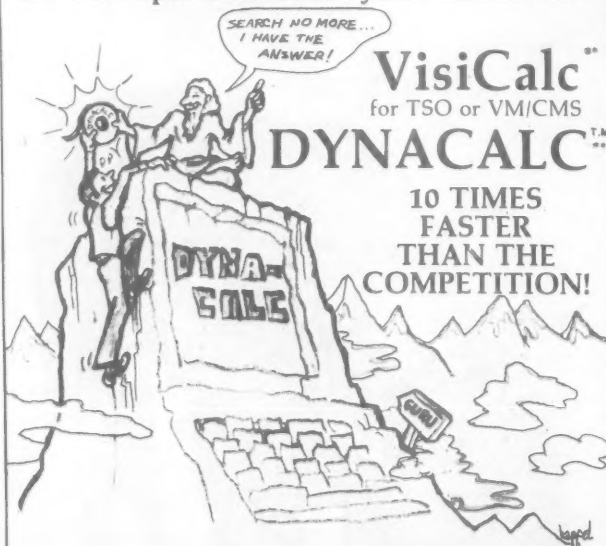
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THE SOFTWARE ENGINEERS



Two Suppliers Claim Victor Owes \$14.7 Million

By Patricia Keefe
CW Staff

Two suppliers to the financially troubled Victor Technologies, Inc. have revealed they hold accounts re-

ceivables totaling about \$14.7 million from Victor.

The disclosure was forced by "wild" investor speculation about the amount of the receivables, according to a spokeswoman for the Chatsworth, Calif.-based Tandon Corp. The second creditor is said to be Xebec, Inc., located in Sunnyvale, Calif.

Victor owes Tandon about \$12 million, primarily for products delivered on an

open account basis from May through August, the spokeswoman said. The remaining \$2.7 million in accounts receivables reportedly is held by Xebec and covers products shipped during the same time period on the same account basis.

Since Aug. 11, Tandon has been shipping to Victor on a cash basis, while Xebec reportedly has ceased shipments. Tandon is talking

with Victor about continuing product shipments and payment of the past-due amount, the spokeswoman said.

Xebec reportedly has not yet determined the ultimate collectibility of the Victor accounts and is conducting similar talks with the troubled micro maker.

The Victor orders reportedly represent a small part of Tandon's business, although

Tandon is said to be the sole supplier of 5¼-in. disk drives for the desktop Victor 9000 business computer. Xebec makes disk drive controllers.

Micro maker Victor lost \$11 million in the second quarter and anticipated another loss in the third quarter. Victor also has laid off about 1,650 workers since last August, leaving the company with a work force of just over 1,000 employees.

Nickels & Dimes

Information Science, Inc. has filed a registration statement with the Securities and Exchange Commission covering a proposed initial public offering of 1,482,000 shares of common stock. The offer is being underwritten by a group led by F. Eberstadt & Co., New York, and Hambrecht & Quist, San Francisco.

\$\$\$

Software AG Systems Group, Inc. has reported revenues for the first fiscal quarter of 1984 of \$8.6 million, compared to \$6.4 million for the same period last year, a 36% increase. Net income for the period rose to \$1.1 million, or 18 cents per share, from \$149,000, or 2 cents per share.

\$\$\$

Anacom, Inc. has reported fourth-quarter revenues of \$31 million and a net loss of \$11.5 million, or 95 cents per share, compared to revenues of \$29.3 million and a net loss of \$1.4 million, or 15 cents per share in last year's fourth quarter. For the year, Anacom reported revenues of \$172.2 million, with a net loss of \$3.9 million, or 38 cents per share, compared with revenues of \$109 million and earnings of \$2.8 million for the prior fiscal year.

\$\$\$

Analogic Corp. has reported sales of \$128.8 million for the fiscal year ended July 31, up 22% over last year. Net income for the period rose 28% to \$15 million, or 85 cents per share, compared with \$11.8 million, or 20 cents per share, for last year.

\$\$\$

Dataproducts Corp. has reported revenues of \$91.4 million and net income of \$3.4 million, or 17 cents per share, for the quarter ended Sept. 24, a gain of 8% in revenues and 36% in income over the comparable period last year.

\$\$\$

Data Decision Computer Corp. has announced a 38% increase in revenues and a 57% increase in net income for the third quarter ended Aug. 31. Revenues rose to \$26.4 million, up from \$19.1 million for the same period in 1982, while income rose to \$1.5 million, or 19 cents per share, from \$957,000, or 14 cents per share.

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Aggressive Strategy Planned GE Sells Printer/Relay Arm to Its Management

By Peter Bartolik
CW Staff

WAYNESBORO, Va. — Boosted by financial commitments from two New York investment firms, the former Data Communications Products Business Department of General Electric Co. "will be aggressive," according to its new president.

In a transaction officially

unveiled last week, the department was sold to the operation's management group in a leveraged buyout that reportedly is valued at \$50 million.

Curtis Powell, former general manager of the department, was named president of Genicom Corp., which will continue to manufacture data communica-

tions printers and relays.

In an interview with *Computerworld*, Powell said the buyout was the only feasible option among several opportunities that had been considered over the last two years since GE refocused its operations under Jack Welch, board chairman.

The operation did not fit in well with GE's alignment

since it sold its computer vending operations and for the last two or three years has been shifted around in the corporate organization, Powell said.

Under the GE philosophy, he said, "we had to look at what it would take to get to No. 1 or No. 2 or to get a technical leadership position." When other alterna-

tives were judged not to be attractive, Powell made the purchase offer with the backing of the investment firms of J.H. Whitney & Co. and Welsh, Carson, Anderson & Stowe. Several of the division's managers will receive shares in the new corporation, Powell said.

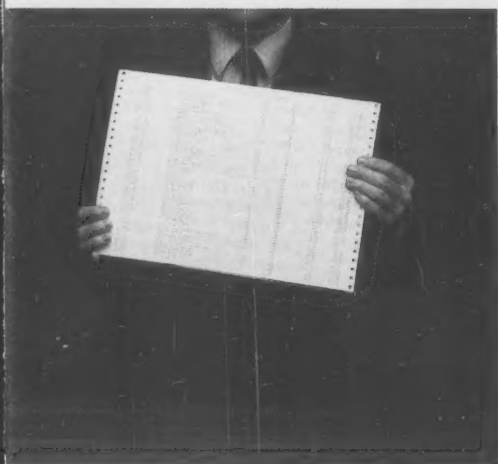
Powell said the new entity will be aggressive. "The commitment is to make it successful," he said. All relevant patents have been transferred to the new company, Powell said, adding, "Basically, we have the talent, the patents and the technology."

With revenues in the range of \$130 million last year, the company is the third largest domestic printer supplier and has experienced solid growth, Powell said. Orders for the company's relay products were up 45% in the first nine months of this year, he said.

The nonimpact printer that GE for so long was supposed to bring out has not been financed by the division since 1979, Powell said. "I wouldn't dust it off," he added quickly, saying the new company is going to have to market a nonimpact printer.

He said the GE prototype, developed in a GE lab and assigned to the division, was funded heavily from 1977 to 1979 and drained resources from the division's core products. "During a 1979 review, we indicated we could not meet our objectives and fund the nonimpact printer," he said.

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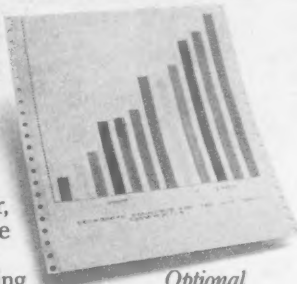


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Mergers & Acquisitions

Automatic Data Processing, Inc. has acquired a portion of **Computer Sciences Corp.**'s business services operations for an undisclosed amount of cash plus contingent payments based on future business results. Included in the acquisition is the processing of payroll and other accounting services for more than 2,000 customers.

Fairchild Industries, Inc., Germantown, Md., has reached an agreement with **Insouth Microsystems, Inc.** of Auburn/Opelika, Ala. to acquire 51% of the privately held firm for approximately \$6 million.

Bank of America has completed acquisition of **Managistics, Inc.**, a subsidiary of Chase Manhattan Bank. Details of the acquisition were not disclosed.

Semi Equipment at Issue Shipper Out on Bail in Export Case

By Peter Bartolik
CW Staff

BOSTON — A New York shipping firm manager named in a federal indictment, along with his company and a Belgian native, was released on \$100,000 surety after being arraigned here this month on charges of illegally exporting a semiconductor manufacturing device to a Soviet bloc country.

Michael Kolleczeck, 24, reportedly a West German native living in Saddle River, N.J., pleaded innocent to six counts of export violations handed down in a grand jury indictment and was released after a \$100,000 surety was made against a co-sure-

tor's real estate holdings, according to assistant U.S. Attorney Dennis Kelley.

Also charged with six counts was Joseph d'Haens of Antwerp, Belgium, who was arrested last August by Belgian authorities after reportedly falsifying a Belgian import certificate stating the equipment in question was for use in Belgium. Kelley said he did not know if d'Haens is still in custody.

The indictment alleges that, in March of 1982, the men shipped a GCA Corp. Mann 4800 Direct Step-On Wafer System (a photo optical mask-making device) from Boston to Hungary. The equipment allegedly

was flown to Zurich on a Swissair flight and then trucked to Budapest.

The indictments charge Kolleczeck and d'Haens each with conspiracy to violate the Export Administration Act, two counts of violating the act and three counts of making and filing, or causing to be made and filed, false statements to government agencies. If found guilty, Kolleczeck, who is scheduled for trial Dec. 13, could face fines of more than \$9 million and imprisonment of up to 25 years.

Kolleczeck reportedly is the manager of Airfo International, Inc. of Jamaica, N.Y., which was also charged with three counts of violating the export act.

Book Contends Embargoes Strain Soviet Relations

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — American supporters of East-West trade said in a book released earlier this month that U.S. restrictions on trading with the Soviet Union serve only to aggravate already tense relations between the two countries.

The book, *Common Sense in U.S.-Soviet Trade*, appeared as the U.S. Congress began final debate on renewing the Export Administration Act, the primary instrument of government control over American exports to the Soviet bloc. The book, a collection of essays and reports, argued that properly structured trading relations between the two nations can benefit both societies.

"One reality we all should recognize is that there is no advantage in not doing business," Robert D. Schmidt, Control Data Corp. vice-chairman of the board, said in the book's forward.

'Ineffective' Policies

"The strategic relationship between U.S. and Soviet military power is such that we either must live with the Soviets on this planet or die with them. There is no point in aggravating our relations with the U.S.S.R. by punitive trade policies which are politically ineffective and economically self-destructive," he wrote.

Schmidt is president of the American Committee on East-West Accord, which produced the collection. The committee consists of some 400 members from the fields of industry, labor, science, academia, government and politics and journalism.

Several executives from IBM, Burroughs Corp. and CDC are committee members; CDC Chairman William Norris authored one of the essays in the book, which also includes a piece by former President Nixon and a Central Intelligence Agency report on Soviet economic strengths and weaknesses.

In his forward to the book, Schmidt cited U.S. government trade actions between 1970 and 1982 that, he said, have "seriously" impaired "the reputation of the U.S. as a reliable trading partner."

According to Schmidt: "Our export controls prevent the sale by U.S. companies of products and technologies which are available from other western countries. Our competitors are free to sell what we are not, and these sales are often products and technologies which command high prices because the socialist countries need these imports to supplement their growing industrial base."

"The manner in which we have administered export controls has not only damaged our economic interest, it is also manifestly clear that we have failed, through our embargo on a wide range of exports, to prevent the Soviets from achieving their economic and military goals," he said.

Common Sense in U.S.-Soviet Trade is available for \$5 from the American Committee on East-West Accord, 109 11th St. S.E., Washington, D.C. 20003.

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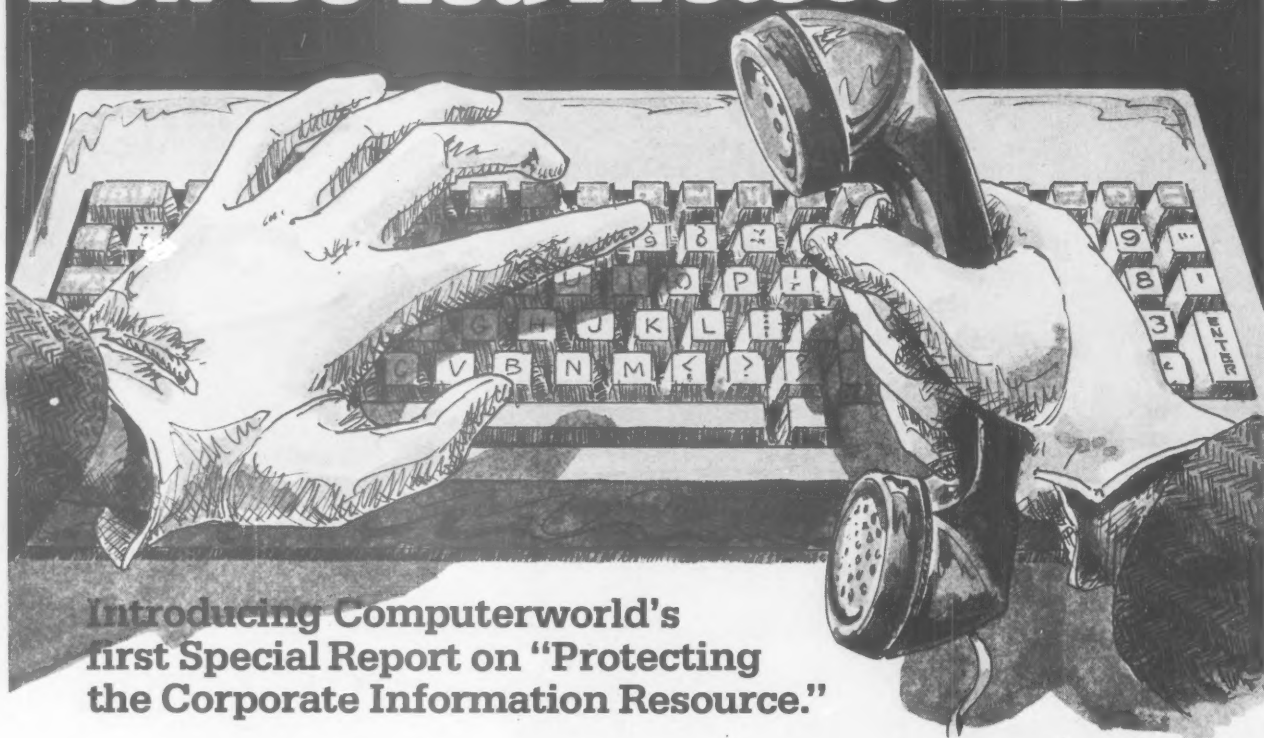
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Seagate/Atasi Deal: A Double-Edged Sword?

By David Myers

CW New York Bureau

NEW YORK — Depending on whom you talk to, Seagate Technology, Inc. either paid too high a price when it agreed to buy Atasi Corp. for about \$131.4 million or the acquisition will promote the newly combined company to the head of the disk drive class.

Scotts Valley, Calif.-based Seagate agreed in principle to acquire 7.2 million shares of privately held Atasi at \$18.25 a share. Closing the sale still requires the drafting of a definitive agreement and approval of both firms' directors.

Comdex '83 Will Be Held Oct. 24-27

AMSTERDAM — Comdex/Europe '83, the second annual European conference and exposition for the computer industry's independent sales organizations (ISO), will be held at the RAI Congress and Exhibition Center here Oct. 24-27.

According to the Interface Group, Inc., the conference producer, more than 300 computer and computer-related companies are expected to exhibit, and total show attendance will exceed 10,000. Seven plenary conference sessions will be held to address a range of business, financial and marketing issues of relevance to European ISOs.

Comdex conferences and expositions are presented for independent sellers of small business systems products, including computer retailers, dealers, distributors, systems integrators, commercial OEMs, office machines and office products dealers and manufacturers' representatives.

Admission to the conference is \$27. More information is available from the Interface Group, 300 First Ave., Needham, Mass. 02194.

But analysts who spoke to *Computerworld* in the wake of the initial agreement were sharply divided on whether Seagate had struck a good bargain.

Raymond J. Bosso, an analyst at L.F. Rothschild, Unterberg, Towbin here, said Seagate's acquisition of Atasi's voice-coil technology makes the newly enlarged company "unstoppable at 5 1/4 inches." The Atasi technol-

ogy gives Seagate the opportunity to go to 46M bytes, Bosso said.

Other Wall Street analysts, who asked that they not be named, said \$131 million is too high a price to pay for advanced Winchester technology.

"You mean [Seagate] couldn't go out and hire some people? What this deal says to me is that Seagate felt the high end of the market

would explode quickly, and it couldn't wait," one analyst said.

Big Losers

Analysts who favored the deal said privately that the big losers are Seagate rivals Micropolis Corp., Priam Corp. and Computer Memories, Inc. and Atasi competitors Maxstore, Vertimag Systems Corp. and Evotek.

Seagate increased its capi-

talization by 17% to bring off the deal.

Priam and Computer Memories are worth nearly the amount of Seagate's increased capitalization, analysts pointed out.

The acquisition of Atasi, which has said that it expects to be an \$80 million company by next year, could make Seagate a \$700 million vendor by 1987, according to enthusiastic analysts.

Getting your system in front of management is finally made simple.

Now your system can be accessed quickly and easily with Northern Telecom's Displayphone terminal. It's as simple to use as a telephone. And compact enough to fit on everyone's desk.

Perhaps the most difficult part of your job is getting your system in front of the people who would benefit from it most. Management often finds computer terminals too bulky or too complicated to operate. As a result they shut themselves off from information that can be vital to your company's productivity.

MIS professionals in a variety of industries have discovered the Displayphone* terminal, an ideal solution to the problem of user acceptance. Voice and data are integrated into one compact unit whose sophisticated capabilities are so easy to use, everyone will welcome it on their desks.

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In addition to its ease of use, the Displayphone terminal offers powerful data access capability.

It is an asynchronous terminal that can also be configured to operate in IBM 3270 and other sophisticated computer environments. This flexibility gives users high speed access to a full range of corporate and public data bases.

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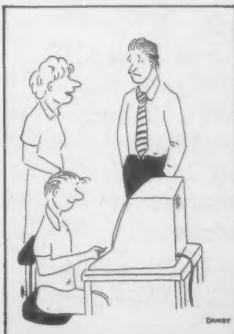


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Supershorts

Infocorp's recently released second quarter survey of retail computer stores revealed that the Apple Computer, Inc. Apple II and IIe were the easiest models to sell to the home and school markets while IBM dominated the business and professional markets. The quarterly survey monitors major product and distribution trends among independent and franchise chain microcomputer retailers and is based upon between 250 and 300 telephone and mail surveys across the country. The most widely distributed models were the Apple II, Apple IIe, Apple III, IBM Personal Computer, IBM Personal Computer XT and the Osborne Computer Corp. Osborne I.

Honeywell, Inc. will provide third-party maintenance for **Racal-Redac, Inc.** customers under terms of a recent agreement. In addition to the Honeywell service, Redac has field service engineers in Boston; Philadelphia; Dallas; Anaheim, Calif.; and Santa Clara, Calif.

NCR Corp. has donated hardware and software valued at nearly \$1 million to Miami University. The NCR system will be used in the university's School of Business Administration.

Control Data Corp. plans to open nine stores specializing in microcomputer software in California by the third quarter of 1984. The stores, which will be patterned after Control Data Corp.'s Software Only Store, which opened a year ago in San Diego, will carry microcomputer software for businesses, schools and homes.

Intel Corp. is halving the die size of its industry-standard 64K byte electronically programmable read-only memory and is using a larger wafer to increase the production rate nearly fivefold in response to rapidly growing market demand and tight supplies.

Apple Computer, Inc. has begun shipping international versions of its Lisa personal computer in Europe, Australia and New Zealand. Lisa software and users' manuals are available in French, German and British versions now, with Spanish, Italian and Swedish versions scheduled to be released in 1984.

Nippon Telegraph and Public Telephone Corp. is accepting applications for research and development on four new products: integrated service fiber-optic sub-

scriber system equipment, high-definition TV fiber-optic subscriber system equipment, one-way video communication terminal equipment and two-way video communication terminal equipment.

Burroughs Corp. has been awarded a \$48.6 million contract by the Federal Bureau of Investigation for the installation of terminals and

tempest-qualified printers in its Washington, D.C., headquarters and field offices in 61 U.S. cities.

Pixel Computer, Inc. has established a wholly owned subsidiary in the UK to handle sales, service and support of Pixel's family of 16- and 32-bit Unix-based supermicrocomputers in the U.S. The subsidiary, Pixel Computer UK, Ltd., will also provide

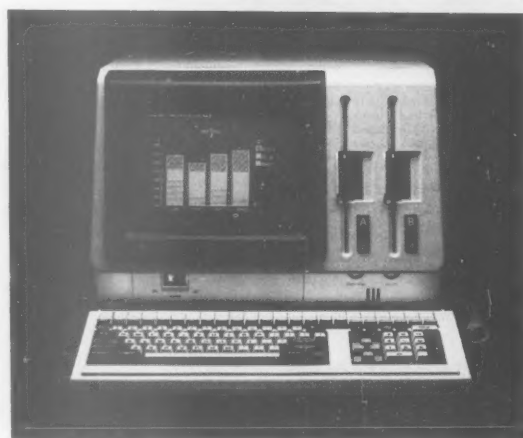
technical support to Pixel distributors in Western Europe.

Harris Corp. has transferred its Information Systems International Division headquarters from Melbourne, Fla., to Geneva, Switzerland. Harris has also signed a merger agreement with **Lanier Business Products, Inc.** and will acquire the firm through the issu-

ance of .525 of a share of Harris stock for each of the approximately 15 million Lanier shares presently outstanding.

Cray Research, Inc. has extended its design and development agreement with Seymour Cray an additional two years until Dec. 31, 1987. Under the agreement, Cray acts as an independent contractor, furnishing develop-

CAN YOU FIND THE IBM* 3278 HIDDEN IN THIS PICTURE?



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In fact, the Advanced Personal Computer is the best personal computer for direct connect 3278 emulation, with 3274 and 3276 controllers.

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And the APC is fully compatible with all 15 different 3278 keyboard configurations.

And it offers a full range of communications protocols, including SNA/SDLC, asynchronous and bisynchronous.



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Supershorts

ment work for the company's advanced computer systems. ***

Plexus Computers, Inc. has announced agreements with three software manufacturers, TOM Software, Inc., Science Management Corp. and Bridge Software Concepts, to distribute software that will allow Plexus users to run software written for Digital Equipment Corp.,

Wang Laboratories, Inc. and Basic Four Corp. minicomputer systems on Plexus computers. ***

The Japan External Trade Organization (Jetro) has opened a Center for Industrial and Technological Cooperation (Citec) in New York and in San Francisco to promote a smoother flow of capital and technology between the U.S. and Japan. Citecs are

also being established in London, Paris, Brussels, Milan, Italy, and Dusseldorf, West Germany, as part of Jetro's efforts to encourage cooperation among industrialized nations. ***

Prime Computer, Inc. has signed a contract with Cipher Data Products, Inc. to purchase at least 1,000 Cipher Microstreamer II 1600/3200 bit/in. streaming tape

drives per year. Value of the two-year contract was not disclosed. ***

NCR Corp. has announced a nationwide scholarship program that will award an NCR personal computer and a \$3,000 college scholarship to approximately 100 graduating high school seniors. Offered through the NCR centennial scholars program, established by the

company as part of its 100th anniversary celebration for 1984, the program is being administered by the college scholarship service/sponsored scholarship programs, an activity of the Educational Testing Service of Princeton, N.J. ***

Vector Graphic, Inc. has added seven Digital Research, Inc. CP/M-compatible software packages to its business software marketing service, Vector Quest. They are Benchmark, a cluster of office automation products from Metasoft Corp.; Planfin, a forecasting and budgeting program, and Profin, a financial analysis program from Business Software Pty., Ltd.; Mag/base, a data base system from Mag Software; Omtool Corp.'s Softbol, a Diabol-compatible language; FMS-80, a menu-driven relational data base management system from DJR Associates; and a package developed by a Vector dealer, Universal Business Automation, for the wholesale distribution market that combines a variety of accounting functions. ***

Victor Technologies, Inc. has signed an agreement with Peachtree Software, Inc. to distribute Peachtext 5000 with its Victor 9000 microcomputer. ***

The EFT Group, Washington, D.C., and the Mid-Atlantic Exchange, Inc. of Raleigh, N.C., have reached an agreement in principle to combine under a common holding company, creating what is reputed to be one of the largest electronic banking networks in the U.S. The 86 financial institutions that will make up the new company serve customers in four states and the District of Columbia and have combined assets in excess of \$60 million. ***

Digital Equipment Corp. and Tektronix, Inc. of Beaverton, Ore., have announced an agreement to cooperatively market Digital's VAX 32-bit superminicomputers and Tektronix's specialized hardware and software development tools. ***

SRI International, Inc. has formed a new unit, the Information Systems and Consulting Division. The new division's functions will range from the development of expert systems and other applications of artificial intelligence to the analysis of information processing products and services, operating systems, local-area networks, terminals and personal computers. ***

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Executive Corner

• **Paul E. Huber** has been elected president and chief executive officer of Megatek Corp.

• **Martin D. Winnick** has been named vice-president of software and development at Mag Software, Inc.

• **David I. Caplan** has been appointed senior vice-president, technical operations, for Fortune Systems Corp.

• **Gerald R. Birr** has been named vice-president, chief financial officer and treasurer for Ztel, Inc.

• **Robert A. Fuire** has been promoted to vice-president and general manager of the Taps Division of Informatics General Corp.

• **Robert R.B. Dykes** has been appointed executive vice-president, fi-

nance and administration, at Xebec Corp.

• **Cal Shoemaker** has been named vice-president for sales and marketing at Timeplex, Inc.

• **George Winkle** has joined Sorcim Corp. as vice-president, finance operations, and **Ronald E. Grubman** has been named vice-president, general counsel and head of corporate development.

• **Harold E. Patterson** has been appointed president, Sylvania systems group at GTE Communications Products.

• **Michael J. Rowny** has been named vice-president and treasurer of MCI Communications Corp.

• **Donald A. Millers II** has been named vice-president of engineering at Megatek Corp.

• **Scott Gilmour** has been named vice-president, marketing, for Corporate Systems.

• **Samuel H. Fuller** has been appointed vice-president, group manager for research and architecture, and **Jeffrey C. Kalb** has been appointed vice-president, group manager for large-scale integration, at Digital Equipment Corp.

• **John Frank** has been named vice-president, marketing, at Zenith Data Systems.

• **Edward J. Hall** has been appointed president and chief executive officer for I/Net-Pacnet Corp.

• **Storage Technology Corp.** has announced the following appointments: **Mornay R. Maloney**, corporate vice-president of European operations; **Archie H. Higgins**, corporate vice-president and general manager of the Storage Technology Documentation subsidiary; **Frank M. LaHue**, corporate vice-president in charge of international manufacturing; **Donald A. Oliverio**, corporate vice-president of sales of western operations.

• **Richard E. Johnson**, a founder and former president and chief executive officer of Amlyn Corp., has been elected chairman of the board and executive vice-president. **Tom McCrystal** has been named to succeed him as president and chief executive officer.

• **David Fleming** has been named president of Communications Products-Asia for GTE Communications Products Group and will head GTE's first Tokyo office to market communications systems and services.

• **R.L. Earnest** has been named president of VM Software, Inc.

• **Robert Healy** has been appointed senior vice-president of marketing for Software International Corp.

• **Rodney A. Bayne** has joined Micro Five Corp. as vice-president of finance.

• **Frederick A. Snow** has been named vice-president and general manager of Infodynamics, a wholly owned subsidiary of Management Analysis Co.

• **Leonard J. Koch** has been appointed vice-president of major account marketing at NBI, Inc.

• **Gerald R. Birr** has been named vice-president, chief financial officer and treasurer for Ztel, Inc.

• **Roger Llewellyn** has been appointed managing director of Wicat Systems Ltd., London, a wholly owned subsidiary of Wicat Systems, Inc.

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Responsibilities will include the development, design and implementation of firmware for micro-processor-based products, and the optimization of firmware development for real-time run requirements. Assignments will include development of digital signal processing algorithms involving signal filtering, modulation/demodulation and effective implementation of hardware/firmware requirements. BS/MS EE and a minimum of 8 years' experience in real-time software/firmware design and implementation are required. Assembly language programming experience with a variety of microprocessor knowledge is highly desirable.

SOFTWARE DEVELOPMENT PROGRAMMERS/ANALYST

Responsibilities will include the development of high quality programs using PASCAL and other high level languages. Should be experienced with microcomputers including operating systems, local area networks and applications programming. Should be familiar with standard design, test and documentation techniques. BS/MS Computer Science or equivalent and previous microcomputer experience required; training/experience in assembly programming beneficial.

DESIGN ENGINEER (SENIOR)

Your responsibilities will include providing design support for development of microprocessor-based data communication products. Digital signal processing, analog filters, and standard digital design experience required, in addition to adherence to strict quality, reliability and performance requirements. A BS/MS EE with 5 or more years experience in microprocessor-based design and digital signal processing experience are required. Data communications product design and active filter (Analog) design highly desirable.

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Data Center Manager will be responsible for operating a six-processor, state-of-the-art computing facility including hardware support, computer operations, software technical support, development support, and performance management. Applicants must have experience in resource and personnel planning, hardware and software procurement, contract negotiations, systems software development, data base administration, IBM OS or VS systems programming, and financial analysis. Knowledge of SAS software and a bachelor's degree, preferably in computer science, or equivalent experience, are required. Qualified candidates should have 15 years' experience in data processing with IBM large-scale mainframe expertise, with at least five years in a supervisory capacity.

Performance Analyst will be responsible for 3083/4341/3158 system performance measurement, tuning, and resource balancing in support of on-line software product development and batch production systems running under MVS/XA, MVS/370, VM/SP, DOS/VSE, and OS/VS1. Candidates must be able to develop a comprehensive performance management and capacity planning program. MVS/SP or VM/SP, and IBM hardware experience are required. Experience with CICS/VS, RMF, IMS/VS, TSO, SAS software, OMEGAMON, ACF/VTAM, ACF/NCP, or VCN is a plus. Applicants must have a minimum of five years' systems programming experience. Technical proficiency in Assembler language and a bachelor's degree, preferably in computer science, or equivalent experience are required.

Data Base Software Developer will design and develop data management subsystems and user interfaces. Applicants must be familiar with query language design, relational data base theory, SQL, and indexing methods. A master's degree in computer science is preferred. Knowledge of SAS software is a plus.

MVS Systems Programmer will support MVS and MVS/XA systems software and related products on an IBM 3083 processor. Duties include installing, maintaining, enhancing, and modifying IBM and OEM vendor software products; working with operations personnel in problem solving; and providing assistance to internal users. Applicants must have a minimum of five years' systems programming or technical support experience with three years as an MVS systems programmer. Experience with SMP and technical proficiency in Assembler language are required. Experience with JES2, TSO, and ACF/VTAM is highly desirable. Knowledge of PL/I and IMS/VS or CICS/VS is a plus.

OS/VS Systems Software Developer will develop and maintain the SAS system supervisor and related components for the IBM OS/VS and MVS/XA environments. Use of IBM 370 Assembler as a programming language and exposure to OS/VS supervisor and data management services macros are required. Experience with the development and support of large software systems and the use of IBM service aids is desirable. Familiarity with operating system concepts,

compiler design and implementation, PL/I, and the SAS system are significant assets. A bachelor's degree, preferably in computer science, or equivalent experience is required.

VM/CMS Systems Programmer will support VM/CMS systems software and related products on an IBM 4341 processor. Duties include installing, maintaining, enhancing, and modifying IBM and OEM vendor software products; developing system utilities; working with operations personnel in problem solving; and providing assistance to internal users. Applicants must have a minimum of two years' systems programming or technical support experience with one year as a VM/CMS systems programmer. Technical proficiency in Assembler language is required. Knowledge of VSE/VTAM and VCN is a plus.

VM/CMS Systems Software Developer will develop and maintain VM/CMS systems software for internal applications and Institute Program Products. Applicants must have a minimum of one year's experience as an OS/VS1 or OS/MVS systems programmer, and one year's experience as a VM/CMS systems programmer as the most recent job experience, including writing SVC traps, I/O traps, and applications requiring knowledge and use of Assembler as the primary programming language. A working knowledge of PL/I and SAS software is also desirable. A bachelor's degree, preferably in computer science, and excellent communication skills are required.

PL/I Systems Programmer will support compiler and minicomputer interface development for SAS software under several mini and microcomputer operating systems. Applicants must have demonstrated growth potential and three years' experience in systems development. In-depth knowledge of PL/I is required and knowledge of SAS software is highly desirable. A bachelor's degree, preferably in computer science, is required.

Systems Programmer will assist the development of SAS software products on various minicomputer systems. Applicants must have a minimum of two years' PL/I programming experience, working knowledge of SAS software, and experience with one of the following minicomputer systems: Digital VAX under VMS, DG MV under AOS/VS, or Prime under PRIMOS. A BS in computer science is required. Knowledge of SAS/GRAPH and SAS statistical procedures is desirable.

Testing & Documentation Systems Programmer will perform source code management functions, including documentation of procedures and consultation for SAS System developers on Digital under VAX. Applicants must have 1-2 years' data processing experience, with a working knowledge of PL/I and SAS. Candidates must have experience with IBM under TSO or VM/CMS, or one of the following systems: Digital VAX under VMS, DG MV under AOS/VS, or Prime under PRIMOS. One to two years' VMS experience is desirable. A BS degree in computer science or equivalent is required.

Minicomputer Programmer will develop SAS software for various minicomputers. The individual will write and maintain code and documentation, transport code, prepare master tapes, and educate users. A BS degree, preferably in computer science, and PL/I knowledge are required. Minicomputer experience, knowledge of SAS software, and Assembler language experience are preferred.

DG Minicomputer Programmer will be responsible for developing SAS software for the Data General minicomputer. Responsibilities include writing and maintaining machine-dependent code, reviewing documentation, transporting code from the VAX minicomputer to the Data General, and assisting in educating users. Applicants must have knowledge of PL/I and a BS degree, preferably in computer science. Experience with Data General minicomputers, knowledge of SAS software, and Assembler language experience are preferred.

Systems Developer will be responsible for the design and implementation of a PL/I-like compiler. Applicants must have a MS in computer science or mathematics and a strong background in block structured languages, preferably in PL/I. Experience in design and construction of state-of-the-art compilers and familiarity with optimization and code generation issues are required.

Communications Systems Programmer will support ACF/VTAM and ACF/NCP/VS systems software and related products under MVS/XA, MVS/370, VM/SP, OS/VS1, and DOS/VSE on IBM 3083, 4341, and 3158 processors, and 3705 and 3725 controllers. Applicants must have a minimum of five years' systems programming or technical support experience. Experience with SMP and a technical proficiency in Assembler language are required. Experience with JES2/NJE, VM RSCS Networking, TSO, and CMS is highly desirable.

Communications Systems Software Developer will develop and maintain the SAS system supervisor components for the IBM MVS, VM/CMS, and VSE environments that interface to communications terminals and access methods, such as the 3279, 3287, 3268, and ACF/VTAM. Use of IBM 370 Assembler as a programming language and knowledge of SNA protocols, 3270 data streams, and MVS or CMS supervisor services macros are required. Experience with the development and support of large software systems and the use of VTAM/NCP service aids is desirable. Familiarity with PL/I and the SAS system are significant assets. A bachelor's degree, preferably in computer science, or equivalent experience is required.

Technical Writer will document SAS installation procedures and advanced programming concepts. Applicants must have a bachelor's degree and PL/I programming experience. Familiarity with an operating system and the ability to communicate technical information to people with various technical backgrounds are required.

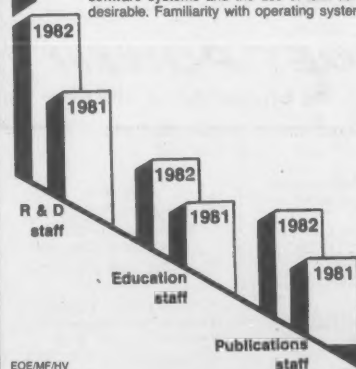
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Advanced Software Specialist (OS-1100) Provide operating system support to Sperry 1100/80 computers. Experienced in SYSGEN's TCP application, and panic dump analysis.

Advanced Software Specialist (CMS/TELECON) Provide TELECON support to five 95 Sperry DCP40's, controlling 100+ branch network and 300+ in-house terminal system. Experienced in TELECON and CMS support.

Transaction Processing Group Leader Minimum of six years' maintaining or enhancing Sperry 1100 Control Software. Fluent in COBOL and 1100 Assembler. Minimum of two years' technical supervisory experience.

Data Base Group Leader Experience with hierarchical data base management systems in a large business environment. Minimum two years' technical supervisory experience required.

Senior Data Base Specialist (DMS-1100) Minimum of four years' experience using and maintaining DMS-1100. Experience with IBM data base products desirable.

Senior Systems Programmer (CICS) Three to five years' systems and programming experience in current CICS software products, such as CICS/PS, DLI, MPO, ISC, PA 3, OMIGAMON CICS. Experience in network products such as ACFT/VTAM and ACFT/INCP a plus.

Applications Support Analyst Provide technical support to applications programmer/analysts. Heavy COBOL experience in a transaction processing/data base management environment required. Responsible for second-level problem resolution.

Senior Programmer Analyst Responsible for host-to-host machine interfaces. Minimum four years' COBOL programming experience. Knowledge of a major vendor's Assembler is desired.

Programmer/Analyst Responsible for host-to-host machine interfaces. Minimum two years' COBOL programming experience.

Senior Hardware Specialist Assist the supervision of all installation and maintenance activities. Extensive knowledge of Sperry (1100 series) or IBM large-scale, multi-processor hardware configurations, lay-outs, and diagnostic techniques mandatory.

Senior Performance Analyst Experience with System Control Software on Sperry 1100 or IBM 303X systems. Solid performance analysis experience which includes the use of system modeling.

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Manager, Network Department Responsible for the design and maintenance of a network supporting nearly 1,000 devices. A management track record, with a minimum of 8 years' experience in DP communications is mandatory.

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The Academic Computing Center requires a systems programmer to help maintain a DEC 2080 system running under TOPS-20. Responsibilities include maintenance of the operating system, system utilities and languages. Some experience with telecommunications and networking is also needed. Master's Degree in computer science or related field, two years of FORTRAN, and 3 to 4 years of TOPS-10/20 experience are required. Excellent fringe benefits package, friendly academic atmosphere, and an agreeable living environment in the Burlington area. Please submit a resume with cover letter along with the names of 3 professional references. For further information contact Personnel Department, Waterman Building, University of Vermont, Burlington, Vermont 05405.

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Responsible to the Director of the Computing Center for development activities, including application and systems programming, networking and contract and grant activities. For more information please contact:

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University of New Mexico
Computing Center
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Albuquerque, NM 87131
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COMPUTER SCIENCE FACULTY POSITION.

Applications are invited for a faculty position beginning January 1984. Candidates who have completed their doctorate in computer science or who expect to complete one are preferred, but more experienced candidates will also be considered. Candidates with a doctorate in mathematics and interest in retraining in computer science will be considered. Facilities include the College's HP3000 and the Department's TRS-80. Applications should be sent to **Merry Lewis Allen, Head, Department of Mathematics/Computer Science, Longwood College, Farmville, VA 23901, AA/EOE**

EXECUTIVE POSITIONS IN COMPUTER AND COMMUNICATIONS TECHNOLOGY

The U.S. General Accounting Office has two executive level openings for professionals who are highly skilled in computers and communications technology. The positions are at GAO's Washington, D.C. Headquarters within its newly formed Information Management and Technology Division, and provide a unique challenge to qualified professionals. The available opportunities are:

CHIEF SCIENTIST FOR COMPUTERS AND COMMUNICATIONS

Provides expert advice and consultation on computers and communications technology issues to the Comptroller General, senior GAO officials, and the Congress. Represents GAO when dealing with congressional, government, and industry officials. Provides assistance and guidance in planning GAO work in technical areas. Individuals should have (1) Ph.D., Doctor of Science, equivalent academic credentials or equivalent experience in the computer and/or communications-related fields, as well as (2) extensive knowledge and recognized accomplishments in computer and/or communications technologies such as computer and network architecture and operating systems design. This is a 3-year noncompetitive appointment.

ASSOCIATE DIRECTOR

Manages a group of professional information systems auditors who plan and conduct evaluations of Federal agency management and use of computers, communications, and other information-related resources. Responsible for preparing written reports and presenting oral testimony to Congress on results of such evaluations. Individual must have extensive knowledge of computer and communications technologies, managerial experience, and excellent oral and written communications skills. This is a competitive Senior Executive Service Career Appointment.

These positions offer full Federal benefits. For information and application procedures call **Joan Clark, (202) 275-5603**.

Applications must be returned by **November 25, 1983**.

U.S. General Accounting Office
Personnel, Room 4716
441 G Street, N.W.
Washington, D.C. 20540



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Senior Technical Support Analyst

Puget Sound Power & Light Company, one of the largest investor-owned electric utilities in the Pacific Northwest, is searching for an "MVS INTERNALS HEAVY WEIGHT."

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COMPUTERS AND THE LIBERAL ARTS

Reed College seeks an energetic and imaginative person with a strong academic or industrial background who has scholarly interest and practical experience in computing sciences. The College is poised to take a substantial initiative in the establishment of a campus-wide system networking large numbers of personal computers with particular attention to facilitating the broadest possible use of the computing resources in the context of a rigorous Liberal Arts curriculum. Thus, we are seeking a person who will be able to address the computer-related interests of students and faculty in diverse disciplines and provide guidance and leadership toward further development of an open-access computer system in this academic context.

This position was created by a gift to the College from the John D. and Catherine T. MacArthur Foundation. The term of the initial appointment is negotiable but expected to be not less than six months or more than 3 years. The successful applicant will have faculty status and a formal association with an appropriate academic department. It is expected of the occupant of the MacArthur position that he/she will lead an upper division undergraduate seminar in an area of his/her expertise during each academic term in residence. In addition, it is anticipated that he/she will participate actively and as a consultant in the implementation of the program for diffusion of computer-based information handling in the Liberal Arts. The closing date for applications is January 15, 1984. Address enquiries and applications (including resume and three letters of recommendation) to: S. Arch, Ph.D., Chair, MacArthur Search Committee, Reed College, 2203 S.E. Woodstock Blvd., Portland, Oregon, 97202. Reed College is an AA/EEO employer.

DIRECTOR COMPUTER SERVICES NORTHWESTERN MICHIGAN COLLEGE

The Director of Computer Services provides leadership and direction for the College's computing environment. Primary responsibilities include management of computer operations, planning and review, staff management and development and budgetary planning. Reports to Vice-President for Administrative Services.

Specific responsibilities include 1.) Coordination of services to users in Instructional Services, Administrative Services, Student Services and the Development Office; 2.) Supervising the design, assignment and implementation of new systems; 3.) Establishing priorities for application and system services in coordination and consultation with advisory committees, computing staff and users; 4.) Determining inadequacies in programs and systems - evaluating requirements and priorities for improvement; 5.) Maintaining reports and statistics indicating the amount and types of services performed; 6.) planning and overseeing the proper documentation of computing systems.

Qualifications: 1.) Master of Business Administration Degree; 2.) Three to five years DP experience in a collegiate setting (DEC PDP 11/70); 3.) Working knowledge of accounting; 4.) Technical and administrative experience related to the management of a computer center (managerial effectiveness will be considered of prime importance in the selection process); 5.) Extensive knowledge of Student Records Information System, Financial Applications, Word Processing and an in-depth knowledge of program languages.

Salary Range: \$22,232 - \$34,835

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Selected candidate will direct a staff of 25 data processing professionals.

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DATA BASE ANALYST - requires good IMS technical skills with 2-4 yrs of experience in online environment.

PROJECT LEADER - for loan systems. Requires strong project mgmt. skills. Will consider any industry exp.

PROGRAMMER ANALYST - knowledge of TOTAL & ENVIRON 1 definite plus.

NC

PROGRAMMERS - with mfg. exp. & 2 yrs. COBOL.

PROGRAMMER/ANALYST - minimum 3 yrs CICS Command/Macro.

DATA BASE ANALYST - dev. standard/define data reports, & definition modeling/knowledge of logical & physical structures (rel. req.)

SC

PERFORMANCE ANALYST - Software tuning & performance skills required.

SYSTEMS ANALYST - 4 yrs exp. Requires design/implementation of mfg. order servicing & financial applications.

For more information on these and other DP opportunities, contact Larry Stone at (704) 375-0800 or send resume in confidence to:

FOX-MORRIS
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Charlotte, NC 28281

Computer Corporation of America

Pursue your research in the best of company.

Computer Corporation of America is a recognized leader in the research and development of data management systems, data communications, distributed database, and man-machine interfaces. Since its foundation in 1965, CCA has had a strong commitment to research for the purpose of advancing the state-of-the-art in database technology which often involved the use of entirely new techniques and exceptionally sophisticated software solutions. From this research have come several commercial products including **MODEL 204**, the most powerful and fastest growing DBMS for IBM mainframes. Along the way, CCA has attracted and retained a staff which includes some of the most prestigious names in database management research. Exploring the following opportunities could put you in the best of company.

COMPUTER GRAPHICS

Systems Analysts/Programmers are needed to begin development of a graphics-oriented professional workstation for database administration. The workstation will provide powerful tools for visualizing and manipulating graphical representations of database schemata. An expertise in database management and/or computer graphics is required. Experience in UNIX, C or Multics is helpful. An advanced degree in Computer Science or a related field is preferred.

CAD/CAM DATABASE MANAGEMENT SYSTEM

A Project Manager and several Systems Analysts are needed to design, develop and implement a CAD/CAM database management system. This system will provide a central repository for all CAD/CAM data needed during the project life cycle. It will replace the storage and management functions of individual data repositories. Experience in the design and development of a large scale DBMS in an IBM environment is required. CAD/CAM experience is a definite plus. An advanced degree in Computer Science or a related field is preferred.

DATABASE SUPPORT for LARGE APPLICATIONS SYSTEMS

A variety of challenging positions exist for Database Consultants, Systems Analysts and Programmer/Analysts to support the design, development and implementation of large, complex applications systems utilizing **MODEL 204**. Advise customers on the application of advanced data management techniques including database design, data dictionaries and distributed data management. Experience with a commercial DBMS in a large IBM environment required. These positions will be located in Cambridge, MA and Denver, CO; some travel necessary. U.S. citizenship required.

DISTRIBUTED DATABASE MANAGEMENT SYSTEMS

A Project Manager, Lead Systems Analyst and several Systems Analysts/Programmers are needed to design, develop and implement a production distributed database capability for an interactive IBM environment with **MODEL 204**. Experience in the design and development of large software systems in an IBM environment is required. Training in DBMS technology and experience using a commercial DBMS required. BS/MS in Computer Science is preferred.

DATABASE COMPUTER SCIENTIST

A Computer Scientist with experience in database management systems is needed to be an internal consultant on the application of advanced data management technology for a variety of CCA projects. A Ph.D. or equivalent in Computer Science is preferred. Some travel may be necessary and U.S. citizenship is required.

Send your resume, specifying position of interest, to David Levine, Dept. CW1024-83, Computer Corporation of America, 4 Cambridge Center, Cambridge, MA 02142.

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Acquire one of the most demanded & rewarding programming skills in months instead of 3 to 5 years. A complete self-study book based on CICS latest version 1.5, written in COBOL and with special emphasis on VSAM. It covers virtually every CICS technique you will ever need. Fifteen (15) sample programs address all CICS major applications. Sample programs include: Menu, Add, Update, Delete, Browse, Print 24x80, Print 66x132, Print Any Size Report, Message Routing, Screen Refreshing, VSAM Alternate Index Setup and Manipulation, Constant Table Setup and Use and more.

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Seeking an Interactive Systems Coordinator for our HP-3000 installation. Responsibilities include systems hardware and software specification preparation, user interface, program development and implementation of application systems. Bachelor's Degree in Computer Science or related discipline plus 5 years experience required. Experience must include MPE, COBOL, IMAGE, QUERY, V/3000, Programmer Productivity Package and computer security. Must also possess good communication skills. Position part of a six person shop serving administrative computing needs of the Ames Laboratory, U.S. Department of Energy. Located on the campus of Iowa State University. We offer competitive compensation and benefit package. Interested candidates should send resume and salary history to: Sue C. Porter, Assistant Personnel Officer, Ames Laboratory, 127 Spedding, ISU, Ames, Iowa 50011. An Equal Opportunity/Affirmative Action Employer. M/F/N/H

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Manager / Systems Programming

Responsibilities include participation in the development/implementation of computer hardware and software planning and resource management. You will coordinate the implementation/maintenance of all operating systems and software products. VM/MVS and/or OS/VS1 and CICS background required.

Manager / IRM Operations

Primarily, you will assist in the administrative functions of Computer Operations in the areas of hardware, software, service level agreements and Problem/Change Management. You will also evaluate and recommend future computer and communications hardware needs. Interfacing with all KFC users and vendors will be required.

At least 8-10 years' experience with computer mainframes, associated peripherals and data communications equipment is required for both positions. You should be thoroughly familiar with IBM operating systems and software. DOS/VSE to MVS conversion experience is essential. Management and interpersonal skills, as well as a degree (or close to completion) in Business, Computer Science or related field are required.

We offer an excellent salary, comprehensive benefits program and a professional environment. For further information, please send your resume, stating background, salary history and requirements, to: Ms. Kathleen Brittain, Employment Specialist, Kentucky Fried Chicken, P.O. Box 32070, Department 294C, Louisville, KY 40232. We are an equal opportunity employer M/F.



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The successful candidate should have extensive knowledge and experience in the following areas:

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Ms. Kashmira Patel
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The University of Arizona, Tucson, is seeking senior level professional for local area network design, development and operations. Responsibilities include design, specification, selection of all elements of local data communications network, including wide-band links, switching, monitoring, and control facilities. Person filling position will lead development of University-wide network. Position requires advanced knowledge of digital and analog communications systems, a bachelor degree in Communication Systems Engineering, Electrical Engineering or a related discipline and three years of experience with very high speed circuit or packet switched data networks or seven years of communication systems design, implementation, operation or maintenance experience including three years of very high speed circuit or packet switched network experience.

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MIKE HUNTER - 3101 Ponderwood Court
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Suite 108

San Jose, CA 95129

(408) 554-8121

Systems Analysts and Systems Programmers

Handley Walker Data Services, an NYC computer services firm that is moving to Woodbridge, New Jersey, is seeking both Systems Analysts and Systems Programmers to modify and develop software for the cable TV and warehouse distribution industries. Applicants must be competent in Assembler language.

Salaries range from \$15K to \$50K depending upon education and experience.

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Applicants should send resume and salary history to:

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Applications and nominations are invited for the position of Associate Director of the Southeast Regional Data Center (SERDAC)/Director of Academic Computing at Florida International University. The University, a member of the State University System of Florida, is composed of 7 colleges and schools and has approximately 15,000 students. The position reports directly to the Executive Director of SERDAC and has responsibility for the management of the Academic Computing Center which services the instructional and research needs of the faculty and students of the University. The individual selected will have direct supervisory responsibility over a unit which serves as the academic support arm. The individual selected will not have day-to-day responsibility for computer facilities operations, but rather will be expected to provide vision, leadership and the ability to plan for rapid expansion and growth. These activities are carried on in coordination with the Provost of the University.

The University is seeking to attract an individual who has at least a Master's degree in computer science or a related discipline and a minimum of 5 years in academic computing with some administrative/managerial responsibility. A Ph.D. with qualifications for a faculty appointment is desirable. The beginning salary will be in the mid \$40's.

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Paul O. Gallagher
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ANALYST/PROGRAMMER to \$36K

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ANALYST/PROGRAMMER to \$36K

Min. 3 yrs. Analysis, Design Development & Programming & Implementation of business systems in a large mainframe IBM OS/VS environment. Proficiency in COBOL OS/VS, JCL & IMS DB/DC required. SAS, TSO/SPF experience and a college degree a plus.

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ANALYST/PROGRAMMER to \$36K

Min. 3 yrs. Analysis, Design Development & Programming & Implementation of business systems in a large mainframe IBM OS/VS environment. Proficiency in COBOL OS/VS, JCL & IMS DB/DC required. SAS, TSO/SPF experience and a college degree a plus.

ANALYST/PROGRAMMER to \$36K

Min. 3 yrs. Analysis, Design Development & Programming & Implementation of business systems in a large mainframe IBM OS/VS environment. Proficiency in COBOL OS/VS, JCL & IMS DB/DC required. SAS, TSO/SPF experience and a college degree a plus.

ANALYST/PROGRAMMER to \$36K

Min. 3 yrs. Analysis, Design Development & Programming & Implementation of business systems in a large mainframe IBM OS/VS environment. Proficiency in COBOL OS/VS, JCL & IMS DB/DC required. SAS, TSO/SPF experience and a college degree a plus.

ANALYST/PROGRAMMER to \$36K

Min. 3 yrs. Analysis, Design Development & Programming & Implementation of business systems in a large mainframe IBM OS/VS environment. Proficiency in COBOL OS/VS, JCL & IMS DB/DC required. SAS, TSO/SPF experience and a college degree a plus.

ANALYST/PROGRAMMER to \$36K

Min. 3 yrs. Analysis, Design Development & Programming & Implementation of business systems in a large mainframe IBM OS/VS environment. Proficiency in COBOL OS/VS, JCL & IMS DB/DC required. SAS, TSO/SPF experience and a college degree a plus.

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You should have a BS in CS, Math, EE or a related Technical discipline as well as experience with DEX VAX, Data General or Tandem Systems and any of these languages: FORTRAN 77, PASCAL, PL/I, ADA, DEC MACRO Assembly. Experience desired in several of the following areas: Real-Time Database Systems, Advanced Software Methodologies, Modeling and Simulation, Image Processing for Displays, Network Protocol Software, Real-Time Scientific Software Development and Software Documentation.

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Requires a BS in EE, CS or related field, MS or PhD desired, and at least 5 years experience in any of the following: image processing; information processing; meteorological systems; SIGINT systems; information handling & routing; storage, retrieval and display; high-speed local area network; tactical and strategic systems; artificial intelligence; analysis, simulation and modeling; minicomputer and microprocessor distributed processing systems; computer and software architecture; photogrammetry; cartography.

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Responsible for computer system integration, real-time systems software design and hardware/software interfaces in laboratory and test environments in the area of Ground Data Systems. Experience required on Gould SEL 32, DEC VAX 11 or HP 9845. Must have a proven track record in computer systems applications in the area of data acquisition and control, firmware development, operating system concepts and direction of software development. Requires BS degree in Computer Science/Mathematics or Electrical Engineering.

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Candidates must possess relevant degree and real-time software; Fortran and/or Assembler experience in an RSX-11M or VAX environment in the area of process or supervisory control, or energy management.

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Responsibilities include providing a full spectrum of services to corporate users to achieve "user" systems development, data analysis and education involving system/supporting tools (DATA/RIEVE). Must possess a degree in Computer Science or equivalent experience. VAX experience a necessity.

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Rhode Island College
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Providence, Rhode Island 02908
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Manage the development, implementation and maintenance of information systems for the Minnesota Department of Revenue.

Responsibilities include providing conceptual leadership in information systems and developing a comprehensive data processing plan. Candidates must have a minimum of three years management experience in the design, planning, development and implementation of application systems in a large scale computer environment. This experience must include the on-going management of systems analysis, development and programming activities including the supervision of systems analysts and programmers, and be acquired within the last six years.

Contact the Minnesota Department of Revenue, Personnel Office, location 122, P.O. Box 43446, St. Paul, MN 55164 (612) 296-3414 for the required application form. Applications will be accepted no later than 4:00 pm on November 14, 1983. An eligible list of qualified candidates will be established.

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PROGRAMMER/ANALYST-

Temp. proj. invlv. programming, analysis, coding & testing of prototype on-line trading room facility in money market environment. Knowl. of COBOL, CICS, TSO, IMS/VS, TIO & IBM 3033/83. 2 yrs. exp. or 2 yrs in programming \$32,100 p.a. 35 hrs/5 days/wk. ACSIS, Inc., 90 John St., NY, NY 10038. SEND RESUMES.

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Managerial and technical position supervising the data processing function, including overall systems analysis and hardware/software evaluation. Requires B.S. in computer science, 5 years progressively responsible experience in computer programming and systems analysis and design. Minimum 2 years supervisory experience. Unlisc 3040 computer. Reports to finance director. 1983 salary range \$30,756 to \$35,364 per year depending on qualifications. Apply by October 28, 1983 to:

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Requires knowledge of the Data Dictionary and experience in IMS, including data base administration and design functions. Application development using COBOL or PL 1 is also required.

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Requires a minimum 3 years experience with a thorough knowledge of COBOL. Exposure to BAL and MVS preferred but not essential. Openings exist in CABLE TV or CREDIT CARD systems.

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Should understand Bank Credit Card Systems including interchange, authorization processing, ticket entry, storage & retrieval, familiarity with cardholder & merchant processing and PIN# verification and electronic data capture essential.

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MUST have Cable TV background in analysis, marketing & installation of cable services. Minimum 2 years and degree. Will interface directly with CCS customer base and designing systems/new systems recommendations are included in your responsibilities.

FIS offers highly competitive salary's, excellent benefits and exceptional opportunities for advancement in a dynamic and growing industry. For consideration send resume or CALL TOLL FREE to: DAVE VONTZ

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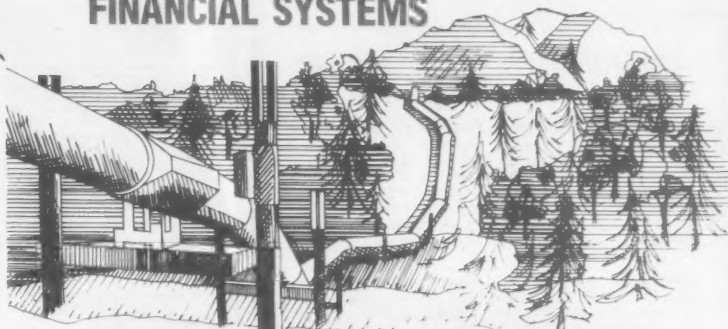


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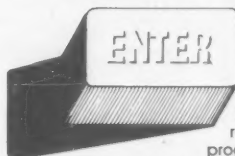
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Applications and nominations are invited for the position of Chairperson, Department of Computer Information Systems. The Chairperson must hold a doctorate with a specialization in either Information Systems or Computer Science. In addition, preference will be given to an individual with impressive teaching, research, and/or industrial experience. It is expected that the Chairperson will enhance the reputation and visibility of the Department both regionally and at the national level.

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Marshall University, located in Huntington, West Virginia, enrolls approximately 11,000 students. The College of Business offers quality programs leading to the BBA, BS in Computer Science, MBA, and MS in Accounting degrees.

Applicants should hold an earned doctorate in the field of Information Systems, Computer Science, or a similar discipline, however those who are ABD will be considered. Business experience is preferred. Salary will be determined by credentials.

APPLICATION DEADLINE: Applications must be received by November 10, 1983 or until the position is filled.

CONTACT: Dr. Robert Babb, Chairman, Department of Computer Science, College of Business, Marshall University, Huntington, WV 25701.

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Rsp. for impl., debugging, testing & user training. Knowl. of COBOL, CICS, ASSEMBLER, VSAM, VTAM, PRG, DOS/VS & IBM 4300 Series. 2 yrs exp. or 2 yrs in programming. \$30,750 p.a. 35 hrs/5 days/wk. ACSIS, Inc., 90 John St. NY, NY 10038. SEND RESUMES.

POSITIONS AVAILABLE

Instr. or Asst. Prof. in Quant. Methods/Comp. Sci. Fall 1984; 2 of 3 tenure track. Areas: telecommunications or comp. sci. plus 1 or 2 of stats, DBMS, languages, digital electronics, op. systems, compiler/assembler construction, data structures, systems software, MS, systems design. Qualifications: PhD or Master's with teaching exp. and/or substantial prof. exp.; competent to teach undergraduate level courses (stats, D.P., BASIC, FORTRAN, COBOL, PASCAL), adv. courses (DBMS, systems software), courses in the evening MBA program (stats & seminars) and the evening undergrad OMCS degree and certificate programs. St. Thomas is a Catholic Liberal Arts College with an undergrad. day and evening division, an evening MBA program, and a Grad. Educ. program. Send resume by 2/15/84 to Dr. B. Foltz, Chair, OMCS Dept., College of St. Thomas, St. Paul, MN 55105.

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Research and software development company has openings for Senior Systems Analysts and Technical Writers to work in areas of local area networking, realtime programming, packet switched networks and software engineering. Minimum requirements include a B.S. in math/physics/engineering or computer science with at least 3 years experience. Hardware experience must include microcomputers preferably HP-1000. Send resume in confidence or call:

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New York City agency-high \$20's-4-years programming experience; 3-years admins-mandatory; RSX 11M-Plus preferred; (benefits plus 4 weeks vacation); Resumes to: New York City Department of Correction, Personnel Division, 377 Broadway, 8th Floor, New York, NY 10013. EOE/MF.

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For Nassau Community College (approx 23,000 enrollment). Position, reporting to V.P. of Academic/Student services, requires Master's degree with computer-related field specialization or business/public administration, plus 5 yrs supervisory & management exp in MIS unit including computer operations systems analysis & programming.

Responsibilities include coordination, general supervision, evaluation, systems control & development, college programming & data operation, plus ensuring security of data base & physical security of on-site IBM4341, Group 2 & associated peripherals/equipment.

A Baccalaureate will be considered if additional relevant training & experience is significant. Experience including academic, financial & administrative needs of an institution of higher learning will be preferred.

SALARY MID \$40's

Send complete resume (no telephone inquiries please) by November 15, 1983 to:

**Dr. Irving L. Williams, Affirmative Action Officer
Nassau Community College, Garden City, N.Y. 11530**

AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER

Director of Data Processing Operations

Oberlin College is looking for an individual capable of filling the position of Director of Data Processing Operations. The position is responsible for the overall management of the Operations, Production Services, and the Maintenance Group within the computing center. Experience in organizational planning and developing operations procedures is essential. A staff of 10 people reports to this position.

Requirements: Three to six years experience in the management of a computer operations department or equivalent organization. Experience in evaluating hardware and software products. The ability to communicate verbally and in writing in a clear, concise manner. Highly developed administrative capabilities. Baccalaureate desirable. Compensation: The position is to be filled as soon as possible. Salary commensurate with experience and qualifications. Fringe benefits include a generous pension program, fully paid medical and long term disability insurance, one month vacation, life insurance and tuition support for children.

Interested persons should submit resumes by November 6, 1983 to:

**George M. Boswell
Director of Computing
Oberlin College
Oberlin, Ohio 44074**

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Could you be a consultant? for MARK IV/V You probably could if:

- You are a good analyst/technician
- You like to meet people
- You like a variety of environments
- You are self motivated

We are the nation's foremost MARK IV-MARK V consulting group and we have immediate opportunities for experienced programmers and analysts skilled in design and development of MARK IV/V systems. Permanent full time positions are currently available in the following areas: Please send a resume or call us collect, today.

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-Mark IV Programmer/Analysts
IMS DB/DC and ADF a big plus

STEVE COMEAU

SSI New England
Software Services, Inc.
Jenney Bldg. Rt 101A
Amherst, NH 03031
(603) 882-6234

LOS ANGELES/SEATTLE

-Mark IV Programmer/Analysts
and Senior Analysts

TONY LAMIA

SSI Western
Software Services, Inc.
50 West Hillcrest Drive
Thousand Oaks, CA 91380
(805) 497-8975

SOUTHWEST/MIDWEST

-Senior Mark IV/Mark V Analysts
IMS, DB/DC and ADF a big plus

JACK HEMPSTEAD

SSI Southwest
Software Services, Inc.
200 Chisholm Place
Plano, Texas 75075
(214) 578-8581

NEW YORK/NEW JERSEY

-Mark IV Programmer/Analysts
Data Base experience helpful

JIM DODD

SSI Midland
Software Services, Inc.
61 North Maple Avenue
Ridgewood, N.J. 07450
(201) 444-9800

Our very competitive salaries are enhanced by bonuses, medical, life and long term disability insurance, full tuition refund, and a liberal expense policy. Reimbursement assistance available.

NOTE: Additional considerations made to those who are capable of extended or frequent travel.

Experience in other Fourth Generation type languages such as NOMAD 2, RAMIS II or FOCUS would also be of interest for New York/New Jersey.

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SOFTWARE

Currently, we have openings for technically competent, highly motivated self-starters in our newly formed East Bay facility.

MANAGER

We're looking for an ambitious, talented manager with proven technical skills on DEC 10/20 operating systems. The ideal candidate will know operating systems, I/O drivers, communications, and be adept in the design and implementation of code that enhances systems availability.

To qualify, you must have three to five years programming experience on DEC 10/20 systems and a like number of years managing a technical systems group that has performed systems design, enhancements, crash analysis, and diagnostics.

SOFTWARE SUPPORT SPECIALISTS

Your primary responsibility will be to upgrade our TYMCOM 10/20 operating system by enhancing its performance, availability, and reliability. The task requires individuals experienced in the thorough analysis, design, coding, and debugging of existing and new software.

These positions require three to five years assembly language experience with micro or macro-coding of the DEC 10/20.

For immediate consideration, please send your resume and salary history, in confidence, to **Tymshare, Inc.** Computer Systems and Support Division, 89100 Liberty Street, Fremont, CA 94538, ATTN: John Swarbrick.



an equal opportunity employer m/f/h

Senior Programmers/Analysts

Key Openings in our Strategic Accounts Branch Automation Systems Group in Dayton, Ohio

NCR Corporation, a leader in the development of financial terminal systems has attractive opportunities in a task force that is marketing and installing the BAS 5000 teller terminal systems throughout the U.S.

Based in Dayton, this dynamic group consists of highly trained specialists who have the experience and enthusiasm to help NCR reach new plateaus within the commercial bank/thrift terminal marketplace.

To be eligible for this position you should have five or more years of data processing experience preferably involving design, development and installation of financial applications. Three or more years of telecommunications experience is required. Two years of experience within an SNA environment is essential. Exposure to financial terminal networks and knowledge of "C", PASCAL or Assembler language are highly desired. National travel is required.

As one of the most respected companies in the field, NCR offers competitive salaries, a comprehensive benefit program and an atmosphere where the challenge, reward and recognition are as great as any opportunity in the business world today.

You should have a technical or business degree with computer science courses. In lieu of a degree, we will consider equivalent experience. If you are successful in your present position and want to expand your potential, forward your resume and salary history to: Mr. Bill Macek, NCR Corporation, 955 Eastwind Drive, Westerville, Ohio 43081.



Complete Computer Systems
An equal opportunity employer

Professional Master's Degree Computer and Information Science

Advance your career in information systems through Dartmouth's distinctive professional program. Our two-year program is designed to equip you to take a leading role in planning, designing, and developing effective business solutions to business problems.

In the CIS Program, you will study current methodologies for planning, analysis, and design; strategies and issues in the management of information systems; business organization; project management; database systems; networks and distributed lectures by practicing managers of information systems, case studies, and professionals-in-residence. An internship is required of each student.

If you have previous experience in the computing field but want to be equipped to assume more responsibility and leadership, consider joining us next year. For more information, write: Program in Computer and Information Science, Dept. C, Nathan Smith Building, Hanover, NH 03755.



Dartmouth College

Senior Technical Consultant - A small computer consulting company dedicated to providing products and services to the users of the VM/370 and CMS systems, has an opening for a Senior Technical Consultant to serve as technical advisor to company clients in all aspects of VM/370 and CMS software, including analysis of business requirements and the development of proposals for increased system development and production. Specific responsibilities include: 1) analysis of client requirements; 2) creation, development and implementation of proposals for VM/370 and CMS system enhancements, inclusive of strict deadline requirements; 3) on site consultation on system evaluation, performance analysis, software quality, problem determination and system internals; 4) design, development, documentation and support software products to support operations on multiple central processor units (CPUs) and 5) lectures, presentations and written contributions for company newsletter on technical aspects of VM/370. Minimum requirements include a Master's Degree in Math/Computer Science or equivalent experience and/or training and at least six years experience in all aspects of VM/370 and CMS and System/370 Assembly language, including four years of management experience related to VM/370 and CMS operations. Specifically, experience must include the design and development of VM/370, VM/SP and CMS system enhancements particularly related to tightly coupled multiple processor complexes and VM-based teleprocessing systems. Also required is demonstrated knowledge of OS-based systems at the internals level, extensive presentation and lecture experience on VM/370 and related topics and demonstrated expertise in operating systems (i.e. CP, CMS), subsystems (i.e. RSCS, PVM), and familiarity with system applications (i.e. VMAP, SMART, DCF). Salary is \$62,400 per year for a fifty hour work week and benefits include three weeks vacation, medical, life and disability insurance. Qualified applicants respond with resume to Box CW-64290, Computerworld, Box 860, Framingham, MA 01701.

Data Processing

SENIOR PROGRAMMER/ANALYST HP 3000

Mission Viejo Company, a leader in the development of masterplan residential communities, has an immediate opening for a Senior Programmer/Analyst to join our business data processing staff.

Responsibilities will include program design, coding, testing, documentation and implementation of business/financial information systems.

Qualified candidates must have several years experience with Hewlett Packard equipment and software; a strong accounting background; have worked with accounting systems and as a liaison with financial users, and developed or used financial modeling or spreadsheet analysis systems.

Please apply by sending your resume to the Personnel Department.

MISSION VIEJO COMPANY

24820 Chiriquita Drive
Mission Viejo, CA 92691
(714) 837-8050

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SUNBELT

SR S/A OS/MVS/CICS RETAIL...\$32K
EDP AUDIT POS/SUPER EXP...\$30K
P/A RPI/GI/SYS 38...\$30K
ACCOUNT MGR RPI INHOSP...\$19K
SR P/A OS/VSE/CICS/VSAM...\$30K
GRP MGR BANK/COBOL...\$30K
P/A OS/VSE/CICS/INV...\$30K
SR S/A COBOL/DB2/VSE/CICS \$28K
RPT SUPER MAPPER/COMUN\$40K



ROBERT HALF

OF LOUISIANA, INC.

P.O. Box 57629

New Orleans, LA 70157

(504) 635-4296

DATA PROCESSING PROFESSIONALS

Be part of our growing company.

The opportunity you have been waiting for may exist at Blue Cross and Blue Shield of Virginia. Our continued success and rapid growth have created challenging new positions on several levels. If you are interested in being a part of this challenge, consider the opportunities below and join us.

• PROGRAMMER • ANALYST PROGRAMMER • SENIOR ANALYST PROGRAMMER

These positions (determined by applicant's level of experience) require a minimum of two years commercial experience with ANS COBOL; experience in medium to large scale IBM mainframe; strong ability in OS/JCL, TSO, MVS; teamwork orientation; capable of system analysis and specification. Experience in a discipline systems/projects management environment; IMS DB or DC experience; or management skills are definite pluses.

• DATA BASE ANALYST

This position requires proven ability as a Data Base Analyst in an IMS environment. Proven management skills and technical experience a plus.

• SUPERVISOR, DECISION SUPPORT

This position will manage the Information Service Center and Micro-computer activities. Position requires a minimum of 8 progressive years data processing experience; knowledge/capability of analyzing, designing and installing Fourth Generation Life Cycle and Micro systems; short and long range planning skills; well-developed written and verbal communication skills; sensitivity to service needs of end-users.

• SYSTEMS PROGRAMMERS

This position requires a minimum of three years experience; familiarity with MVS, BAL, JES 2 and TSO, IMS/DC, VSAM, VTAM, NCP, performance tuning and experience in a multi-processor (loosely coupled) environment a plus.

• TELECOMMUNICATIONS SPECIALIST

This area requires a technical emphasis and strong background in remote telecommunications disciplines. Expertise should include current communications protocols and equipment (minis, terminals, controllers, etc.), network design and performance analysis.

We offer competitive salaries, an attractive benefits package and opportunities for advancement. For immediate consideration, SUBMIT RESUME and SALARY HISTORY IN COMPLETE CONFIDENCE to:



EDP EMPLOYMENT
COORDINATOR
Blue Cross and Blue Shield
of Virginia
P.O. Box 27401
Richmond, Virginia 23279

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FIELD ENGINEERS

Dataserv Computer Maintenance is expanding nationwide. We now have immediate openings in major cities and will be adding more in the near future.

These are key positions and provide excellent opportunities that will lead to further promotion in a fast growing company. Excellent compensation plan and good fringe benefits for experienced individuals. Your potential for personal advancement with a \$100 million plus company is the greatest right now as we expand.

We now have immediate openings in these cities for these positions:

Washington D.C. — FIELD ENGINEERS

We need experienced F/E to maintain IBM 327X display equipment.

Milwaukee, Wisconsin — FIELD ENGINEERS
Immediate opening for engineer with experience on IBM tapes, printers, disks, display equipment.

Dallas, Texas — FIELD ENGINEERS

Excellent position for experienced Field Engineer to work on IBM 327X equipment. We have several openings in the Dallas, Ft. Worth metro area.

Los Angeles, California — FIELD ENGINEERS
Field Engineers required for the support of IBM 3600 Banking and/or Supermarket Systems.

FIELD ENGINEER — MIDWEST LOCATION

Experienced with IBM 5525 Administrative Systems. We have an excellent opportunity and immediate opening for qualified individual.

Dataserv will soon have additional opportunities for field engineers and technical specialists in several other major cities throughout the United States. If you are considering a change in employment, contact Dataserv for a review of what we have to offer.

For immediate consideration and more information call **Toll Free — 800-328-6729** or send your resume to: **Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343.** We are an equal opportunity employer and all inquiries are considered confidential.

dataserv**COMPUTER SPECIALISTS**

IMR Systems specializes in the development and maintenance of software and hardware systems while providing state-of-the-art products to the U.S. Government. You will enjoy:

- TOP SALARIES
- CAREER ADVANCEMENT
- ACHIEVEMENT
- CHALLENGING ASSIGNMENTS

And more as you grow with our company.

- PROJECT MANAGERS
- TECHNICAL WRITERS
- PROGRAMMERS
- ENGINEERS
- SYSTEMS ANALYSTS
- CONFIGURATION MANAGERS

Our Arlington, Virginia office needs experienced:

- PROGRAMMERS (DMS1100, TIP, DPS1100)

If you have 2 or more years mini or microcomputer experience that involves FORTRAN, COBOL, ASSEMBLY LANGUAGE, UNIX, VAX/VMS; operating systems (RDOS), submit your resume along with salary history and requirements for immediate confidential consideration to Mr. Richard Bedell, 1300 N. 17th Street, Suite 950, Arlington, VA 22209, (703) 276-9800.

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ROMAC.**FLORIDA****MEET THE CHALLENGE**

Florida's tremendous growth has created unique opportunities in state of the art environments for motivated, skilled data processing professionals.

PROGRAMMERS, ANALYSTS, SOFTWARE ENGINEERS, SYSTEMS PROGRAMMERS

UNLOCK YOUR POTENTIAL

Romac & Associates of Florida, Inc.

One Tampa City Center, 800 W. Cypress Creek Rd., Ste. 305-C
Ste. 2360-C, Tampa, FL 33602 Ft. Lauderdale, FL 33309
(813) 228-6327 (305) 928-0811

INSTRUCTIONAL SPECIALIST FOR DATA PROCESSING

Mustang Community College is seeking qualified candidates for the professional staff of Instructional Specialist for Data Processing. The candidate must have a minimum of a Bachelor's Degree in Computer Science or a closely related area with a Master's Degree preferred. Teaching experience and/or professional data processing experience, specifically software evaluation and training desirable.

Salary will be commensurate with educational preparation and experience.

Application Deadline: A detailed resume and transcripts should be submitted no later than December 15, 1983.

Interested candidates may apply to:

Diane Osborn
Personnel Director
Mustang Community College
211 S. Quaterline Rd.
Mustang, Michigan 48442
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Affirmative Action Employer

ARE YOU AN EXPERT?**MICRO SOFTWARE DEVELOPMENT**

- Networking
- Systems Programmers
- Programmer/Analysts

We are the fastest growing East Coast consulting agency. If you want to get in on our high rates, bonuses and challenging assignments - and you're of expert quality send resume or call:

the EXPERTS
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(617) 237-1777

GROUND FLOOR OPPORTUNITY

One year old supermicro company, well financed, seeks proven success people to sell expanding OEM and end user product line. Company is distributed processing systems/multuser/network oriented. If you are a top ten percent, and you must be to qualify, this is your chance for an Austin, TX lifestyle, founders stock...an opportunity to make your own future. Full specifics and references to "opportunity" P.O. Box 16672, San Antonio, TX 78216. (Two key sales management spots also open. Bring/select your own sales team)

Systems/Programmer Analyst

On-line data processing center servicing the thrift industry has an opening for creative systems/programmer analyst. Four years banking systems and/or NCR level II experience required. Work with data processing professionals who utilize multiple mainframes in attractive surroundings in central Connecticut suburb. Send resume to:

Connecticut On-Line
Computer Center
Avon Park South
P.O. Box 638
Avon, Connecticut 06001
Equal Opportunity Employer

THIS SPACE FOR HIRE.

(Inquire at Classified Advertising Department)

DATA BASE ADMINISTRATOR TO \$43K

I am conducting an exclusive search for a Data Base Administrator for a high technology manufacturer located in Eastern Massachusetts.

The position requirements include a Bachelor's degree (or the equivalent of proven experience) with 10 years experience in an OS/MVS environment as an IMS data base/data communications analyst. Experience must include data base design in both a batch and on-line environment. A thorough knowledge of MVS and IMS utilities is also required. Supervisory experience, as well as applications experience with a manufacturing company, is a strict requirement.

You will be responsible for managing a data base administration department, supporting the IMS development and production environment for on-line and batch application systems. Responsibilities also include implementing and maintaining backup/recovery/reorganization systems, defining standards for the IMS DB/DC system, providing technical advice and training, and DB/DC fine tuning and optimization.

No resume initially required. Call Mr. Crowe (day or evening) or send resume to: Timothy D. Crowe, Jr., Executive Search Consultants, Dept. 1024, Box 6, Chelmsford, MA 01824. You can be assured of the strictest confidence. Client is EOE.

CALL (617) 256-2008 TODAY.

**WILD & WONDERFUL WEST VIRGINIA**

West Virginia Network for Educational Telecomputing, the statewide computer network for higher education in West Virginia, has the following openings:

IBM LEAD SYSTEMS PROGRAMMER

Bachelors degree and three years IBM operating systems programming experience or equivalent. Provides supervision and technical assistance to senior level systems programmers. Salary to mid 30's.

SENIOR SYSTEMS PROGRAMMER

Bachelors degree and two years combined operating systems programming experience with both IBM and UNIVAC. Salary upper 20's.

Hardware: AMDAHL V7A, NASCO AS5, UNIVAC 1100/80, VAX's, PDP-11's

IBM Software: VM/370 SP2, MVS SP1.3, CICS 1.5, ACF/VTAM, WYLBUR, ADABAS

UNIVAC Software: EXEC 1100, TIP, CMS, DMS/1100, MAPPER

Apply by December 1, 1983 to Personnel Officer, 837 Chestnut Ridge Rd., Morgantown, WV 26505, phone (304) 293-5192. AN EQUAL OPPORTUNITY EMPLOYER

Data Processing Manager

We are the leaders in our food processing industry located in Lindsay, California. We need a strong Data Processing Professional to fill a challenging and high-visibility position reporting to the Vice President of Finance. To qualify you must have at least 5 years experience managing a data processing center utilizing NCR V6555. Excellent technical and communications skills and a strong line manager. Excellent benefit package. Send resume and salary history to:

Lindsay Olive Growers
P.O. Box 278
Lindsay, CA 93247
Attn: Industrial Relations Dept.

COMPUTER TECHNOLOGY INSTRUCTOR

Qualifications: Bachelor's degree in Computer Science or in related field and a minimum of 2 yrs. work exp. in D.P. required. Master's degree in Computer Science with business orientation; knowledge of COBOL, RPG II, VSAM & Data Base preferred.

Duties: Instruct courses such as Intro to C.T., Computer Operations, Automated Accounting, Micro Computers, BASIC, RPG II, FORTRAN, COBOL, etc.

Salary: \$22,680 - \$34,870 for 10% mos. dep. on education & exp.

Starting Date: January 3, 1984

Forward resume to Office of Personnel Services, McLennan Community College, 1400 College Dr., Waco, TX 76706.
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Affirmative Action Employer

SR. ANALYST HP 3000

Internationally recognized service org. is expanding its fan support group. Qualified candidate must have extensive COBOL programming exp & some SPL bkgd. HP 3000 a plus. Exciting growth potential to Asst Mgr as well as future systems planning & telecommunications. Sophisticated MIS group with top flight mgmt.

ROBERT HALF
OF NEW YORK, INC.
832 Fifth Avenue
New York, N.Y. 10018
(212) 221-6000 (agency)

Systems Teaching Position available commencing January 1984: Knowledge of 2 high-level languages, Master's degree in appropriate area and significant practical experience required. Experience in systems analysis, systems management or computer graphics, PhD helpful. Tenure track position, rank and salary dependent on qualifications. Position available pending budgetary approval. Apply to:

Professor Larry Scott
Information Systems
Management Department
Buffalo State College
1300 Elmwood Avenue
Buffalo, New York 14222
by November 15, 1983.

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Data Communications/Marketing



Consider Crystal Clear Skies, Green Forests and Tektronix

If you have mastered the data communications market, bring your talents to the base of Central Oregon's Cascade Mountains—headquarters of the Tektronix Data Communications Testing Division.

THE POSITION: We're recruiting a Marketing Product Line Manager with strong, proven experience in data communications. You will need an acute marketplace awareness of the data communications industry in order to develop our product strategies, marketing programs, pricing and forecasting for the assigned product line.

Additional duties include developing, recommending and administering product promotions; participating in team selling efforts with field sales force; monitoring effectiveness and recommending revisions to marketing strategies.

REQUIREMENTS: BSEE or equivalent required; MBA desired. 3+ years experience in data communications sales/product marketing with proven successful track record. Excellent verbal skills, proven managerial/motivational skills, technical knowledge; outstanding ability to make presentations and participate as a team member.

TO BE CONSIDERED: Act quickly. Send resume and salary history to:

Eric B. Lane
Tektronix, Inc.
625 S.E. Salmon
Redmond, OR 97756
Equal opportunity employer M/F/H

Tektronix
COMMITTED TO EXCELLENCE

SYSTEMS COORDINATORS UNIVERSITY OF FLORIDA

Three positions currently available in a stimulating university environment. All positions require a bachelor's degree plus a minimum of 3 years of relevant experience. Applicants should have proven accomplishments that demonstrate technical ability and system design.

Position #97442 involves planning, scheduling and coordinating computer systems development projects utilizing most advanced, efficient and effective technology for selected university administrative systems. Researches and evaluates new technological developments in computer hardware, software and systems development techniques. Working knowledge of COBOL, CICS and user languages is preferred. Applicants should be able to evaluate and select hardware and software as required. Salary range \$22,140-\$34,000.

The following positions involve training and supervising a technical staff in the development of computer systems using COBOL and CICS. Position #83184 involves planning, designing and coordinating development of CICS systems for the University's administrative users. Salary range \$18,660-\$31,100.

Position #82969 involves planning and designing a computer based administrative information system for the financing area in conjunction with the requirements of the State Accounting System. Salary range \$22,140-\$34,000.

The university offers an attractive fringe package which includes free tuition. Send resume including salary history and requirement by November 3, 1983 to the following address:

George P. Bradley
Employment Manager
University of Florida
4th Floor Stadium
Gainesville, FL 32611
EQUAL EMPLOYMENT OPPORTUNITY/
AFFIRMATIVE ACTION EMPLOYER

NEW START-UP OPPORTUNITIES

Fox-Morris specializes in the placement of all programmers and systems analysts. Our present openings are with Top Fortune 500 companies, with special emphasis on NEW START-UP opportunities on a local and regional basis. For a clear understanding of our client's needs and to know your true value in today's market, call Robert Montgomery at 919-872-2940 or send resume to:

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Since 1962
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Dunhill Means Data Processing Professionals

At Dunhill of Charlotte our only business is finding the right people for the job. We represent many of the largest and most respected corporations across the country. That's why we can offer the busy data processing professional the opportunity to explore the job market without doing any more than simply sending us a resume.

We are not asking you to make any commitment. There is never a fee with Dunhill of Charlotte, and all matters are held in strict confidence. What more could you ask for? We will also keep you up to date on industry trends and current salary ranges in the DP area.

Keep your career running in high-gear by letting Dunhill of Charlotte find more could you ask for? We will also keep you up to date on industry trends and current salary ranges in the DP area.

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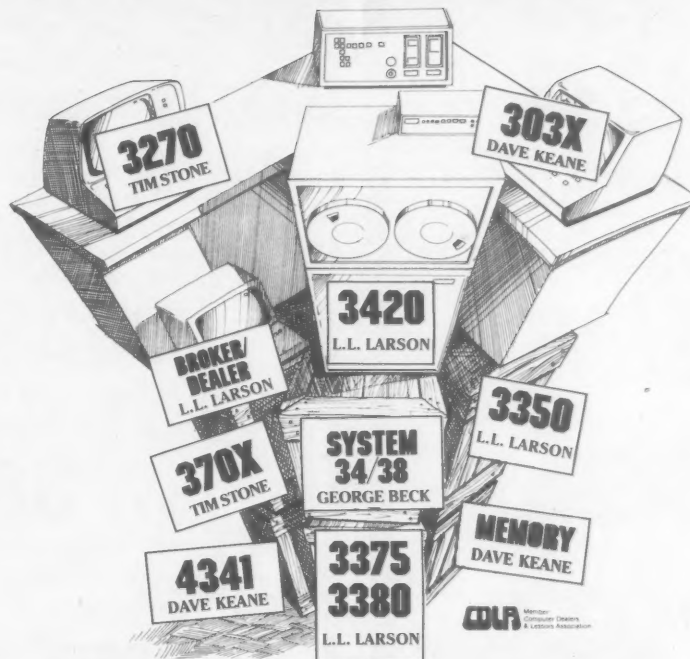
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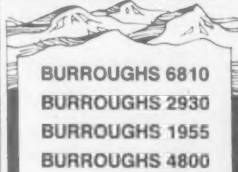
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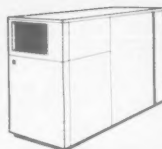
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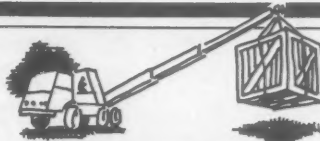
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ADVERTISERS INDEX

Action/Honeywell	87
Amdahl	39
Apple Computer	36-37
Applied Data Research	5
Applied Digital Data	ID/9
Applied Technology Associates	42
Asico	42
Autologic	42
Axios	24
BASF	57
BBN Computer	20-21
BDS	5
John Beall	83
The Bridge	76
Brown Disk Manufacturing	32
Calview Management, Inc.	72
CANAAN Computer	ID/20-ID/21
Check Technology	48
Cincom	29
3-COM	12-13
Comdata Corp.	65
Comdesign	70
Comdisco	26-27
Com/Peripherals, Inc.	72
Compuware	22
Context MBA	ID/22
Continental Resources	ID/14
Control Concepts	38-39
Control Data Corp.	ID/5
CS Computer Systems	ID/7
Cullinet	16-17, 68-69
CWCI	84
CW International	78
CW Subscription	101
CW Supplement	96
Data Base Management	20
Data Processing Design	ID/32
Data Systems For In.	40
Davis, Thomas & Associates, Inc.	40
DEC/TPG	67
Deltak, Inc.	ID/25
Desktop Software	16
Digital Controls Corp.	ID/3
Duquesne Systems Inc.	43
Dynacalc	90
Eastman Kodak Co.	ID/3
EMC Corp.	77
Emery Worldwide	73
Encom Corp.	ID/15
Engineering Design Concepts	14-15
Equitable Life	128
Falco Data	ID/18
Forte Data Systems	ID/14
Fusion Products	ID/13
Gavilan	28, 48
General Research Corporation	10
Group Operations	ID/2
H & W Computer Systems	ID/16-ID/17
HiTech Software Engineering	ID/5
Honeywell Info. Systems	51
IBM	50
Ida Ireland	90-91
Infocore	60-61
Informatics	5
Information Sciences	ID/26
Innovation Data Processing	34
Interface Group	59
Invitational Computing	88
Keytronics	92-93
Kierulff	80
Lear Siegler	99
Lee Data Corp.	ID/30
Lin Processing Co.	72
Local Data	74
Madzar Corp.	ID/28-ID/29
Maxell Computers	30-31
McCormack & Dodge	56
Memorex	ID/4
MicroAge	79
Microdata	94
Micro Data Base Systems	8
MicroFrame	ID/12
Micro-Term	54
MicroTouch Systems	95
Miltron Systems Corp.	25
MSA	98-99
National Trade Productions	52
NCR	100
NEC	56
Netec	97
Nestar	ID/7
New Generations Software	23
Northern Telecom	56
On-Line Software	52
Pansophic Systems	ID/8
Para Research, Inc.	62-63
Parallax Systems	41
PC World	6
Phase Info Machines corp.	86
Prime	35, 49
3R Computers	81
Renex	ID/2
Salvation Army	85
SAS Institute	28
Saturn Systems	58
SDI	18, 52, ID/10, 68
Shearson/Amex	53
Sinware Inc.	79
Software Automation	21
Software Module	7
Sun Technologies and Research	ID/31
Stone Mountain Computing	44-45
Synapse Computer	64
Synsort	71
Systems Concepts of Colorado	72
Technology Transfer	ID/23
Televideo Terminals	ID/24
Term-Tronics	59
The Treasury	75
Tone Software	82
Tower Systems	86
Ungermann-Bass	40
Unipress Software	39
Unitronix Corp.	33
US Postal Service	18
Verbatim	
J. Whitney	
Wolfe Computer	
Xerox Corp.	
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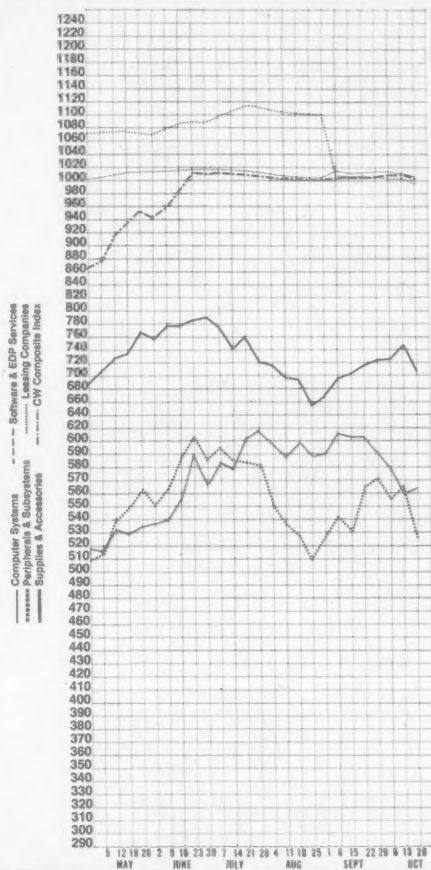
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CLOSING PRICES WEDNESDAY, OCTOBER 19, 1983

Continued Page: 10000000

C	E	K	H	1982-83	CLOSE	OCT 19	NET	CHG	PCT	1982-83	CLOSE	OCT 19	NET	CHG	PCT	1982-83	CLOSE	OCT 19	NET	CHG	PCT
COMPUTER SYSTEMS										SOFTWARE & EDV SERVICES											
O	ALPHA MICROSYSTEMS	12	-24	32 1/4	-1	1/4	-8.2			O	ADVANCED CORP TECH	1	-8	3 1/2	-1	1/2	-12.5				
O	ALPS COMPUTER SYST	8	-28	18 1/4	-1	1/4	-1.9			O	ADVANCED SYSTEMS INC	6	-22	17 3/4	0	0	0.0				
O	ARADAL CORP	80	-82	78 1/2	-1	1/2	-1.8			O	ADCO CORP	17	-32	23 1/4	-1	1/2	-7.0	-3.0	-1.0	-3.0	-1.0
O	ARTIS COMPUTER INC	18	-31	21 1/4	-1	3/8	-1.7			O	AMERICAN SOFTWARE	21	-31	24 1/2	-1	1/2	-2.0	-2.0	-1.0	-2.0	-1.0
N	AT&T	80	-82	78 1/2	-1	1/2	-1.8			N	ANACORP INC	8	-23	33 1/2	3/8	1/8	1.5				
N	BURBORGUS CORP	58	-58	50 7/8	-2	3/8	-2.1			O	ANALYSIS INTL CORP	5	-20	13 1/2	-1	1/4	-6.8				
O	COMPUTER AUTOMATION	7	-17	7	-7	-7	-8.1			A	APPLIED DATA RES.	8	-23	31 5/8	-1	1/8	-3.4				
N	COMPUTER COMMUNICATIONS	10	-10	10	-10	-10	-10.0			O	ARCO COMPUTER	10	-10	10	-10	-10.0					
N	CONTROL DATA CORP	21	-62	48 1/2	-1	3/4	-3.8			N	ASTRADYNE CORP IND	1	-7	2 7/8	-1	-25.0					
N	CONVERGENT TECH INC	20	-20	19 1/2	-1	1/2	-2.6			O	AT&T DATA COMM	22	-22	22	-22	-22.0					
N	CRAI RESEARCH INC	20	-52	47 1/8	-1	-2.0	-2.0			N	USA COMPUTER ASSOC	5	-17	13 1/4	-1	3/4	-11.2				
N	DATA GENERAL CORP	62	-62	68 1/8	-20	-1.4	-26.0			O	COMPUTER ASSOC INT'L	6	-35	23 3/4	-9	-19.3					
N	DATAPoint CORP	24	-124	114 3/8	-1	1/2	-1.7			O	COMPUTER COMMUNICATIONS	11	-11	-2	-15.0						
N	DIGITAL EQUIPMENT	82	-102	72 1/2	-38	-4.4	-26.0			O	COMPUTER NETWORK	6	-10	6 3/8	-5/8	-8.8					
N	EDCO INC	8	-3	3	-3	-3	-3.0			O	COMPUTER SYSTEMS	22	-22	17 5/8	1/4	1/2	-2.7				
N	ELECTRONIC ASSET	3	-15	6	-1	5/8	-21.3			O	COMPUTER TASK GROUP	8	-22	13 3/4	-1	3/4	-11.2				
N	EMULATING POINT SYST	22	-47	30 1/8	-2	3/8	-8.3			O	COMPUTER USAGE	2	-22	13 3/4	-1	1/4	-11.8				
N	FORBORD	22	-47	30 1/8	-2	3/8	-8.3			O	COMPUTING SYSTEMS	6	-38	6 3/4	-1	1/4	-3.8				
O	GENERAL AUTOMATION	3	-15	11 1/8	-1	1/4	-2.1			O	CONSERV CORP	7	-20	6 1/2	-1	1/2	-18.7				
N	GOLLY INC	31	-31	30 1/2	-1	1/2	-2.8			O	CONSIGNA	2	-14	14	-14	-14.0					
N	HARRIS CORP	20	-51	85 3/4	-1	1/8	-2.1			N	CULLINANE SOFTWARE	12	-50	39 1/2	-2	3/4	-6.5				
N	HEWLETT-PACKARD CO	22	-68	38	-2	3/4	-8.5			O	CYCARD SYSTEMS INC	8	-27	20	-1	-1.2	-2.4				
N	HONEYWELL INC	80	-132	120 3/4	-2	1/8	-1.6			N	ELECTRONIC DATA SYS	10	-42	38 1/2	-1	1/2	-3.6				
N	IBM	12	-124	120 1/2	-2	1/8	-1.6			O	HOUM SYSTEM INC	13	-38	31 1/8	-7/8	-2.0	-2.0				
O	IFS SYSTEMS INC	3	-14	6	-1	1/2	-10.0			N	GENERAL ELECTRIC CO	49	-58	53 3/8	-1	1/8	-10.2				
N	LANIER BUSINESS PRD	12	-18	12	-18	-18.0				N	GENCOM	10	-10	10	-10	-10.0					
N	NAFA-CORP	22	-39	22 1/8	-1	7/2	-21.5			N	INFORMATICS INC	10	-34	23 1/2	-2	3/4	-10.4				
N	PARADIGM CORP SYST	8	-8	8	-8	-8.0				O	INFORMATION SYSTEMS	25	-37	37	-37	-37.0					
N	PARADIGM ASSEST	7	-18	13 1/4	-1	1/4	-10.3			O	KENNE ASSOCIATES	4	-13	13	-13	-13.0					
N	MATSUBISHI ELCCARD	47	-77	68 3/8	-3	1/2	-7.4			O	LEOTON	8	-30	28 5/8	-1	1/8	-10.4				
N	MODULAR COMPUTER SYS	7	-14	14	-14	-14.0				O	NET COMMUNICATIONS	4	-13	13 1/8	-1	3/8	-10.7				
N	MODARK DATA SCI	10	-19	19 1/2	-1	7/8	-6.0			O	PNST SCI AMER INC	8	-33	27 1/2	-3	1/2	-12.0				
N	MYOTRONIX INC	18	-18	18 1/2	-1	1/2	-2.7			O	PROLOG APP GRP	10	-10	10	-10	-10.0					
N	NAT'L BERTINCUONATOR	22	-60	54	-1	1/2	-2.7			O	RICOM SYSTEMS INC	25	-50	42 1/4	-5	-10.3					
N	PERKIN-ELMER	17	-17	17	-17	-17.0				O	ROHMCH-MEBER CP	10	-22	8 3/4	0	0	0.0				
N	PERKIN-ELMER	17	-17	17	-17	-17.0				O	NATIONAL DATA CORP	17	-35	28 1/2	-1	3/8	-10.1				
N	PIRE COMPUTER INC	11	-30	15 5/8	-1	7/8	-6.5			O	ON-LINE SOFTWARE INT	17	-27	17 1/2	-2	-10.2					
N	PERRYWAY CORP	11	-44	7 7/8	-1	1/2	-2.2			O	PERKINSYSTEMS INC	10	-20	21 1/2	-3	-12.3					
O	TANDER COMPUTERS INC	14	-28	34	-2	1/8	-5.8			N	PLANNING RESEARCH	6	-21	15	-1	-3.4	-4.7				
N	TANDY CORP	25	-65	48	-1	1/2	-5.8			O	POLICY HNT SYST	13	-39	26	-1	-1.4	-3.8				
O	TELEVISIONS SYSTEMS	14	-41	14 7/8	-1	3/4	-5.3			O	PROLOGICAL & SYS	1	-8	4 1/8	-1	1/4	-3.8				
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N	VLSI LABS "C"	11	-42	32 3/4	-4	-11.4	-11.4			O	SCIENTIFIC COMPUTERS	6	-14	11	-1	-1.4	-2.2				
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										N	TYNARK INC	12	-20	21	-1	-1.4	-1.1				
										N	UAC CORP	3	-18	12 1/8	0	0	0.0				
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N	U.S. LEASING	18	-47	34 5/8	-3	1/8	-8.4			O	BERNARDINI	10	-10	10	-10	-10.0					
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